BARBADOS

ANNUAL REPORT

OF THE

DEPARTMENT OF SCIENCE AND AGRICULTURE

FOR THE YEAR

1954—1955

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DEPARTMENT OF SCIENCE AND AGRICULTURE

STAFF

Director of Agriculture	C. C. SKEETE, O.B.E., B.A., (Cantab).
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Assistant Livestock Officer	A. G. F. SEALE.
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Overseer, Central Livestock Station	A. C. Holder
Farm Overseer, Pine Plantation	M. E. Murrell
Principal Peasant Agricultural Instructor	C. A. E. Beckles, D.I.C.T.A. (Ag.)
Senior Peasant Agricultural Instructor	L. T. Talma
do. do. do. do.	G. A. Ramsay
do. do. do. do.	C. D. Spooner
Peasant Agricultural Instructor	E. S. Brathwaite
do. do. do.	F. M. Cummins
do. do. do.	V. F. Gay
do. do. do.	A. Yard
do. do. do.	E. G. St. John
do. do. do.	H. DaC. Sealy
do. do. do.	C. V. Drayton
do. do. do.	C. A. Riley
do. do. do.	A. J. Bellamy

Peasant Agricultural Instructor	....	....	....	J. E. Wason
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do.	do.	do.	....	E. L. Murray
do.	do.	do.	(Temporary)	T. Grant
do.	do.	do.	(Temporary)	C. L. Bolden
do.	do.	do.	(Temporary)	G. U. Taylor
Senior Analytical Assistant		....	....	K. H. Streat (Ag.)
Analytical Assistant		....	....	R. E. Barrow
do.	do.	..	....	H. J. Skeete
do.	do.	..	....	D. A. Wickham
Entomological Assistant		....	....	W. Headley
do.	do.	....	....	V. E. James
do.	do.	....	....	F. C. Greene
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Entomological Laboratory Attendant			....	A. Gittens
Overseer — Codrington Station		....	....	F. A. Perkins
Field Superintendent	....	....	....	F. A. Jordan
Agricultural Department Messenger			....	G. Barker
Government Laboratory Messenger			....	L. H. Moore

Mr. C. C. Skeete, O.B.E., B.A., Director of Agriculture, attended the Meeting of the Governing Body of the Eastern Caribbean Farm Institute held in Trinidad on 27th November, 1954.

The Director of Agriculture also attended Meetings of the B.W.I. Sugar Cane Investigation Committee, B.W.I. Sugar Technologists' Congress and the Advisory Committee of the B.W.I. Central Sugar Cane Breeding Station.

Mr. W. V. Rose, B.A., Deputy Director of Agriculture, acted as Director of Agriculture while the latter was absent from the Island.

The Deputy Director of Agriculture was granted leave from 6th—15th October, 1954, to attend the Conference on Education and Small Scale Farming held in Trinidad

Dr. M. B. Proverbs, M.R.C.V.S., Senior Veterinary Officer, attended the First Convention of the British Caribbean Veterinary Association (Trinidad Branch) held in Trinidad from May 22nd—29th, 1954, at which all of the British Caribbean Territories were represented.

Dr. P. G. Scoggins, Veterinary Officer, was loaned to the Government of St. Kitts from 22nd—30th June, 1954, to investigate the possibilities for raising livestock on certain areas of marginal land in St. Kitts. He resigned his post in July 1954 to take up an appointment as Livestock Officer, St. Lucia.

Dr. J. E. C. Bywater, M.R.C.V.S., M.R.San.I., was selected for appointment to the post of Veterinary Officer vacated by Dr. P. G. Scoggins. He arrived from England on the 28th January, 1955, and assumed duty on that date.

Mr. J. Bolton, B.Sc., A.R.I.C., was appointed Chemist in August 1953, but was granted a year's course of training at Rothamsted Experiment Station before taking up his appointment. He arrived in the Island on the 6th December, 1954, and assumed duty on that date.

Mr. W. H. C. Knowles, A.I.C.T.A., was re-appointed Cultivation Officer in this Department and assumed duty on the 10th May, 1954. The title of this post was later changed to "Agronomist".

Mr. Knowles was granted 6 days' duty leave in November 1954, to represent Barbados at the 1954 Conference of B.W.I. Sugar Technologists which was held in Trinidad.

Mr. A. D. Herbert, D.I.C.T.A., Irrigation Officer, visited Jamaica for a week in August, 1954, to see irrigation work in that Island.

At the request of the St. Vincent Government, Mr. Herbert paid a visit to St. Vincent for a week in March 1955, for advisory purposes in connection with the introduction of Irrigation at Mt. Bentinck Estates Limited.

Mr. D. W. Wiles, Fishery Officer, attended the Meeting of the Gulf & Caribbean Institute which was held in Havana, Cuba, from 15th—19th November, 1954.

Mr. J. E. Clarke, Agricultural Assistant, was appointed to act as Plant Diseases Inspector, with effect from 1st June, 1954, during the absence of Mr. D. R. D. Wiles who was seconded to the Government of Grenada as Senior Agricultural Assistant, Carriacou.

Messrs L. T. Talma, C. D. Spooner, Senior Peasant Agricultural Instructors and Mr. E. S. Brathwaite, Peasant Agricultural Instructor, were selected by Government for a one-year's course of training at the Eastern Caribbean Farm Institute, Trinidad, and proceeded to that Colony in March, 1954. Messrs Talma and Spooner were awarded Pass Diplomas.

Mr. E. S. Brathwaite was transferred on promotion to the post of Farm Manager at the Mental Hospital Farm and assumed duty on 7th March, 1955.

Mr. B. D. Morris, Long Grade Clerk attached to the Bridgetown Petty Debt Court, was transferred to the Department of Science and Agriculture with effect from 1st May, 1954.

BRITISH WEST INDIES CENTRAL SUGAR CANE BREEDING STATION

ADVISORY COMMITTEE

Chairman— C. C. Skeete, O.B.E., B.A., Director of Agriculture, Barbados.

Members — Dr. G. A. C. Herklots, M.Sc., Ph.D., Principal of the Imperial College of Tropical Agriculture, Trinidad.

— C. H. B. Williams, M.A., A.I.C.T.A., Director of Agriculture, Trinidad.

— R. F. Innes, B.Sc., A.R.I.C., Director of Research, Sugar Manufacturers' Association (of Jamaica) Ltd., (Nominee of the Director of Agriculture, Jamaica).

— A. F. McKenzie, Director of Agriculture, British Guiana.

— R. E. Kelsick, O.B.E., Agricultural Superintendent, St. Kitts-Nevis-Anguilla.

— Sir John Saint, Kt., C.M.G., O.B.E., Director, Sugar Technology Laboratory, Barbados.

— M. A. G. Hanschell, B.A., Dip. Rural Econ., Development Commissioner, St. Lucia.

STAFF

Cytogeneticist	G. C. Stevenson, B.A., A.I.C.T.A.
Botanist	B. deL. Inniss, B.Sc., A.I.C.T.A.
Agricultural Assistant	N. L. Foster
do. do.	C. D. Gilkes
do. do.	A. N. C. Hewitt
Statistical Clerk	E. L. Jones
Stenographer-Typist	Miss S. O. Maxwell

BOARD OF AGRICULTURE

The members of the Board of Agriculture appointed for the Legislative Session 1954-55 were as follows:—

The Hon. G. D. L. Pile, O.B.E., M.L.C., Chairman.
The Hon. J. A. Mahon, M.L.C.
Sir John Saint, Kt., C.M.G., O.B.E.
J. A. Haynes, Esq., B.A., M.C.P.
E. St.A. Holder, Esq., M.C.P.
L. E. Smith, Esq., M.C.P., J.P.
O. T. Allder, Esq., M.C.P.
C. O. Armstrong, Esq.

The Director of Agriculture is ex-officio member of the Board.

REPORT ON THE WORK OF THE DEPARTMENT OF SCIENCE AND AGRICULTURE FOR THE YEAR ENDING 31ST MARCH, 1955

TABLE OF CONTENTS

PART I. Page

SUMMARY OF AGRICULTURAL POLICY 11

PART II.

GENERAL

I. WEATHER CONDITIONS DURING THE YEAR .. 12

II. AGRICULTURAL CROPS 12

A. Sugar Cane

(a) Production.

(b) Export of Sugar and Local Consumption.

(c) Fancy Molasses.

(d) The Special Funds for the Benefit of the Sugar Industry and the Welfare of the Workers.

(e) Acreage under Cane.

(f) Variety Acreages.

PART III.

Section I. SMALL SCALE AGRICULTURE, by C. A. E. Beckles 19

II. CO-OPERATION, by C. A. E. Beckles 29

III. SUGAR CANE BREEDING AND SEEDLING TESTING, by B. deL. Inniss 33

IV. IRRIGATION, by A. D. Herbert 35

V. ANALYTICAL AND TOXICOLOGICAL, by N. Carmichael 38

VI. CHEMISTRY, by J. Bolton 42

VII. AGRONOMY, by W. H. C. Knowles 45

VIII. ENTOMOLOGY, by R. W. E. Tucker 48

IX. PLANT DISEASES, by J. E. Clarke 50

X. ANIMAL HUSBANDRY, by M. B. Proverbs 51

XI. ANIMAL HEALTH, by M. B. Proverbs 54

XII. FISHERIES, by D. W. Wiles 57

PART IV.

FINANCIAL STATEMENT 64

PART V.

AGRICULTURAL LEGISLATION 66

PART VI.

LIST OF PUBLICATIONS ISSUED BY THE DEPARTMENT OF SCIENCE AND AGRICULTURE AND B.W.I. CENTRAL SUGAR CANE BREEDING STATION FROM 1925 TO DATE 67

APPENDIX I.

METEOROLOGICAL OBSERVATIONS RECORDED AT THE METEOROLOGICAL STATION, CODRINGTON, FOR 1954 75

APPENDIX II.

METEOROLOGICAL REPORT FOR 1954 76

APPENDIX III.

BARBADOS RAINFALL FROM JANUARY TO DECEMBER, 1954 77

PART I

SUMMARY OF AGRICULTURAL POLICY

1. The conservation of soil and the maintenance and improvement of soil fertility.

2. The control of pests and diseases of crops.

3. The improvement of crop yields by selection and breeding.

4 The maintenance of a sound animal husbandry industry as an integral part of the farming system. The prevention of the introduction of animal diseases and the control of animal diseases already existing in the Island.

5. The development and improvement of the Fishing Industry.

6. The encouragement of the production of local food crops, especially green vegetables.

7. The stimulation of co-operative ventures, particularly amongst smallholders.

8. The development of irrigation in suitable areas.

PART II.

GENERAL

I. WEATHER CONDITIONS DURING THE YEAR

Detailed climatic data in respect of the current year 1954, as recorded at the Meteorological Station at Codrington, St. Michael, are given in Appendix I to this Report. Water is the principal factor limiting plant growth in Barbados, and since the water supply is almost entirely dependent on rainfall, the monthly average rainfall for the Colony is an important item to record. The average rainfall for the period December 1952—March 1954, which covers the growing period of the plant cane, compared with the average rainfall for the two previous fifty-year periods, is set out in Table I.

TABLE I.

MONTH	Rainfall In Inches		
	Average		Average 1952—54
	1852—54 to 1901—03	1902—04 to 1951—53	
December	4.92	4.61	3.54
January	3.72	3.07	3.35
February	2.24	2.13	2.11
March	1.97	1.93	2.04
April	2.43	2.25	0.91
May	3.58	2.60	2.44
June	5.79	5.09	5.28
July	6.36	6.13	9.52
August	7.79	6.96	8.74
September	8.20	7.40	11.15
October	8.05	7.53	4.93
November	7.85	7.75	10.18
December	4.96	4.52	5.53
January	3.69	3.08	4.84
February	2.19	2.14	2.50
March	2.03	1.86	1.83
TOTAL	75.77	69.05	78.89

The average monthly rainfall figures for the Island for the sixteen-month period, December 1952 to March 1954, when compared with the average figures for the previous two fifty-year averages, show that the rainfall was above average in respect of eight months of the period and as regards total quantity. Due largely to the increased rainfall over the previous year the sugar production was larger than the year before.

II. AGRICULTURAL CROPS

A. SUGAR CANE

(a) Production

The yield of sugar cane reaped during 1954 was the equivalent of 178,960 tons sugar. This was made up of 163,892 tons Vacuum pan sugars, 825 tons Muscovado sugar, and 4,130,569 wine gallons Fancy Molasses, which equated on the basis of 290 wine gallons of Fancy Molasses to the ton of sugar, is the equivalent of 14,243 tons sugar.

The sugar production in Barbados for the past six years is set out in Table II.

TABLE II.

Sugar Production for the Period 1949—1954

	1949	1950	1951	1952	1953	1954
Vacuum Pan Sugar	133,868	141,706	163,313	156,216	150,499	163,892
Muscovado Sugar	1,991	1,276	1,253	525	512	825
Fancy Molasses	16,872	15,201	23,077	11,134	9,740	14,243
	152,731	158,133	187,643	167,875	160,751	178,960

(b) Export of Sugar and Local Consumption

Under existing arrangements, the Ministry of Food purchased that quantity of Sugar which represented the Colony's export quota, at a negotiated price. Sugar produced over and above the negotiated price quota and termed as "Free Sugar" was disposed of at a World Market price. The arrangement for sale of sugar direct to Canada, which was resumed in 1953 for the first time following the end of the second world war, continued during 1954. The export of sugar is still regulated by the Sugar Production and Export Control Board of which the Director of Agriculture is Chairman. Care is exercised to ensure that the requirements of the local market are satisfied.

The position with regard to local consumption and export during the period September 1953 to August 1954 is as follows:—

	Tons	*Tons*
Estimated stocks in hand at 1st September, 1953:—		
Fancy molasses for export	5,154	
Sugar for export	32,000	
Sugar in wholesalers' hands	3,569	40,723
Production during 1954		178,960
		219,683
Estimated stocks in hand at 1st September, 1954:—		
Fancy molasses for export	3,752	
Sugar for export	9,790	
Sugar in wholesalers' hands	6,448	19,990
		199,693
Total exports as per Customs returns, for the period:—		
Fancy molasses	15,116	
Sugar	180,377	195,493
Difference representing sugar delivered to merchants for local consumption		4,200

At the 31st December, 1954, there remained unshipped 600 tons of exportable sugar.

(c) Fancy Molasses

The Barbados Fancy Molasses industry continues to be under the control of the Fancy Molasses Control and Marketing Board of which the Director of Agriculture is Chairman.

At the end of December, 1953, 1,125 tons equivalent to 371,250 wine gallons of the 1953 Fancy Molasses crop remained to be shipped. The Fancy Molasses Control and Marketing Board allocated some 14,243 tons equivalent to 4,130,500 wine gallons for production during 1954 for export. The full quantity was manufactured by the small fancy molasses plants.

The quantity of fancy molasses which the importing markets required out of the 1955 crop production was 19,750 tons equivalent to 5,728,400 wine gallons. The fact that market requirements show some increase may be partly attributable to the introduction of bulk shipment of the product which was permitted in full to Canada towards the end of 1953. The system of bulk shipment appears to be working satisfactorily.

(d) The Special Funds for the Benefit of the Sugar Industry and the Welfare of the Workers.

In continuation of existing arrangements, dating from the 1947 Sugar Crop with the Ministry of Food, the sum of $13.20 per ton of sugar was included in the price for 1954 crop sugars, and has been paid into the following funds in the proportions shown:—

Sugar Industry Rehabilitation Reserve Fund $4.80 per ton.

Sugar Industry Price Stabilization Reserve Fund $6.00 per ton.

Labour Welfare Fund $2.40 per ton

The Sugar Industry Rehabilitation Reserve Fund continues to be administered by the Sugar Industry Capital Rehabilitation Reserve Board, of which the Director of Agriculture is Chairman. The major portion of the funds collected has been paid out in accordance with Regulations made under the principal Act.

The Sugar Industry Price Stabilization Reserve Fund is administered by the Sugar Industry Price Stabilization Reserve Board of which the Director of Agriculture is Chairman. The amounts accruing to this fund have been deposited with the local banks and are earning interest. The purpose of this fund is to mitigate the adverse effect of a reduction in the price of sugar.

The Labour Welfare Fund is administered by the Governor-in-Executive Committee.

The Sugar Industry (Rehabilitation, Price Stabilization and Labour Welfare) (Local Consumption) (Amendment) Act, 1954, was enacted to provide that so much of the levy as is imposed on sugar manufactured in 1954 which is sold for consumption in the Island, shall be paid to the Governor-in-Executive Committee, instead of to the above funds, for the purpose of stabilising the price of certain classes of sugar only, if the Governor-in-Executive Committee thinks this expedient.

(e) Acreage under Cane.

Under the Sugar Cane Census Act, 1937—31, it is compulsory for all landholders with more than ten acres of land to make a return to the Department of Agriculture showing the acres of cane, and the various varieties to be reaped during the ensuing crop season.

The results of the census for the 1955 crop are presented in Table III together with the corresponding figures for the years 1946 to 1955 inclusive.

As a result of the recent surveys the acreage of cane grown by smallholders is estimated at 10,000 acres.

(f) Variety Acreages

These were obtained from plantation returns of the variety acreages to be reaped each year. The variety percentages for all crops for the years 1946 to 1955 are presented in Table IV.

Table III

ACREAGE OF SUGAR CANE REAPED IN THE YEARS 1946—55

Year	ACREAGES								
	PLANTATIONS							Small-Holders (estimated)	Total
	Plant Canes	First Ratoons	Second Ratoons	Third Ratoons	Fourth Ratoons	Fifth Ratoons	Sixth, Seventh, Eighth & Eleventh Ratoons		
1946	14,056.25	11,614.50	5,578.25	1,817.50	51.25	6.00	—	7,000	40,123.75
1947	13,365.25	11,569.00	6,501.00	1,771.50	257.25	2.25	—	7,000	40,466.25
1948	13,480.75	10,614.00	6,281.00	2,126.75	255.50	28.00	—	7,000	39,786.00
1949	13,869.56	10,911.46	5,429.66	2,090.72	370.49	33.00	—	7,000	39,705.22
1950	13,435.78	11,785.71	6,350.76	2,147.50	451.25	53.00	17.25	7,000	41,241.25
1951	12,555.14	11,833.17	7,137.28	2,869.35	558.28	52.00	15.50	8,000	43,020.72
1952	11,531.99	11,519.78	8,344.59	3,813.25	946.27	59.75	24.00	8,500	44,739.63
1953	10,454.10	10,880.16	8,680.89	4,593.29	1,220.26	131.25	22.50	10,000	45,982,45
1954	10.722.22	10,159.25	8,430.18	4,890.81	1,725.70	293.00	32.00	10,000	46,253.16
1955	11.985.96	10,533.04	8,592.26	3,767.95	905.16	236.00	63.00	10,000	46,083.37

Table IV

PERCENTAGES OF ACREAGES OF SUGAR CANE VARIETIES RECOMMENDED BY THE DEPARTMENT AND OTHER VARIETIES REAPED DURING THE PERIOD 1946—55

PERCENTAGES OF TOTALS

Varieties	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
B.2935	0.68	0.26	0.23	0.09	0.04	—	—	—	—	—
B.H.10 (12)	3.19	2.49	1.36	0.33	0.09	—	—	—	—	—
B.726	2.02	1.26	0.70	0.15	0.03	—	—	—	—	—
Mixed and other varieties ...	2.55	1.25	0.52	0.39	0.47	0.96	1.16	1.78	2.14	2.86
B.3439	2.40	0.54	0.25	0.12	0.06	—	—	—	—	—
B.37161	74.52	83.83	90.00	92.76	90.80	84.76	80.06	76.04	73.13	67.47
B.35187	6.09	3.25	1.91	0.98	0.53	0.24	—	—	—	—
B.34104	6.89	3.83	1.24	0.32	0.12	0.15	—	—	—	—
B.4098	1.56	3.00	3.43	4.14	4.93	5.82	6.87	7.39	7.70	8.25
B.41227	0.06	0.08	0.06	0.14	0.49	0.76	0.89	1.01	1.22	1.27
B.41211	0.04	0.21	0.30	0.58	2.44	6.58	9.74	12.54	12.60	12.76
B.43391	—	—	—	—	—	0.73	1.28	1.24	1.03	0.85
B.4744	—	—	—	—	—	—	—	—	1.24	4.38
B.47419	—	—	—	—	—	—	—	—	0.72	1.11
B.45151	—	—	—	—	—	—	—	—	0.22	1.05

The percentages of acreages harvested in different varieties during the years 1946—1955 are given in Table IV. B.37161 occupied 67.47 per cent. of the total acreage reaped in 1955, a decrease of 5.66 per cent as compared with 1954. There was a very small increase of the acreages under B.4098, B.41211 and B.41227. With regard to the newer seedlings, the acreage under B.4744 increased by 3.14 per cent, that under B.47419 increased by 0.39 per cent and B.45151 by 0.83 per cent.

PART III.

SECTION I.

SMALL SCALE AGRICULTURE

By

C. A. E. BECKLES,

Principal Peasant Agricultural Instructor (Ag.).

A. General Conditions during the Year.

THE WEATHER: The rainfall during the first half of the year was slightly better than that for the first half of 1953. Thus, at six District Stations, which are more or less evenly distributed throughout the Island, the average rainfall for this period was 19.42 inches, as compared with 14.72 inches for the corresponding period in 1953. Hand cultivation, which is normally practised by most small-holders, and is generally difficult at this period owing to the dry hard condition of the land, was then relatively easy and preparations for the planting of food crops were completed somewhat earlier than usual. During the second half of the year 1954, the rainfall, except for some heavy precipitations in October, was well suited to the system of agriculture on small-holdings.

THE MAIN FOOD CROPS: The main food crops grown include yams, sweet potatoes, cassava, eddoes, maize and cow peas. As a result of early planting, some of these crops were available by mid-September, when harvesting of sweet potatoes, maize and cow peas was begun. The reaping of "early" yams was started in November. The average yields of sweet potatoes and "early" yams obtained from small-holdings were approximately 6,000lb. and 7,000 lb. per acre, respectively. The reaping of Lisbon yams took place in January and February, 1955, and yields were moderate. With the exception of sweet potatoes, which were heavily attacked by army worms in October and became relatively scarce in many districts by January, all of the main food crops remained readily available up to the end of May.

SUGAR CANE: In the low rainfall areas, notably in parts of St. Philip, Christ Church and St. Lucy, sugar cane planted in shallow soils, especially in the absence of mulch, suffered a severe set-back during the dry spells which occurred in the early months of the year, and again in July and August. The ratoons were the worse affected, owing to the effects of the mealy bug and root borer, in addition to inadequate moisture. Another dry spell in December 1954, and continuing during the early months of 1955, had further adverse effects on the maturing cane crop, and signs of desiccation and arrested development, again particularly in ratoons, were apparent.

The Department's efforts to encourage the small-holder to improve his yields appear to be bearing fruit. Mainly as a result of improved cultural and manurial practices, the small-holder continues to reduce the appreciable difference which has always distinguished his yields from those of the estates. The average difference per acre which had dropped from 11.62 tons in 1953 to 11.36 tons in 1954, showed a further drop to 9.86 tons per acre in 1955. Despite some of the handicaps from which the small-holder suffers, it is possible to close the gap still further, and efforts towards this end will be continued.

The following are some comparative yield data for estates and small-holdings:—

Sugar Cane Delivered to all Factories in 1955

Estates (tons)	*Small-holders* (tons)	*Total* (tons)	*Small-holders' Canes as per cent. of Total*
1,095,773	205,089	1,300,862	15.61

Average Number of Tons of Cane per Acre Reaped in 1955

	Area (acres)	*Yield* (tons)	*Average Yield per Acre* (tons)
Estates	36,083	1,095,773	30.37
Small-holders	10,000*	205,089	20.51

*estimated.

TABLE I.

Summary of Sugar Cane Yield Data, 1948 — 55

Sugar Cane Delivered to all Factories

Year	TOTAL CROP (tons)				Average No. of Tons per Acre Reaped	
	Estates	Small-holders	Total	Small-holders as % of Total	Estates	Small-holders
1948 ..	641,044	77,211	718,255	10.75	19.50	11.03
1949 ..	1,122,072	184,524	1,306,596	14.12	34.31	26.36
1950 ..	1,118,003	198,903	1,316,906	13.04	32.65	28.41
1951 ..	1,402,671	288,806	1,691,477	17.07	40.05	36.01
1952 ..	1,221,701	285,902	1,507,604	18.96	33.71	33.63
1953 ..	1,172,091	209,630	1,381,721	15.17	32.58	20.96
1954 ..	1,301,268	245,302	1,546,570	15.86	35.89	24.53
1955 ..	1,095,773	205,089	1,300,862	15.61	30.37	20.51

Estates refer to holdings over ten acres in size, small-holdings are those ten acres and under. The area in small-holders' canes reaped in 1955, has been estimated as for 1954, at 10,000 acres.

Minor Crops: There is a general tendency among small-holders to follow the practice on estates and concentrate mainly on the cultivation of sugar cane and the main food crops. Nevertheless, the growing of a number of minor crops continues to form an important part of the economy of a large number of small cultivators. Thus, cotton is cultivated, often on marginal land, in the drier parts of St. Philip and St. Lucy, groundnuts form the main crop of some small-holders in the lighter soils of St. Philip, St. Peter and St. Lucy, fruit tree cultivation is practised in the higher rainfall districts of St. Thomas, St. Joseph and St. Andrew, and green vegetables are grown on a field scale in many parts of the Island during the rainy months and throughout the year as specialised crops in irrigated vegetable gardens.

(a) *Cotton.* Owing to the poor conditions of soil and management under which cotton is generally grown, the average yield for the crop is extremely low. As a result of the poor revenue thus accruing to

cultivators of the crop, the area grown to cotton has diminished year by year, and during 1954—55 the total area was only 45 acres. In addition to the unfavourable conditions, pointed out above, the crop suffered the disadvantage of being heavily attacked by pests during the year. These included the cotton worm, *Alabama argillacea*, the green stink bug, *Nezara viridula* and the pink bollworm, *Platyedra gossypiella*. Some cultivators obtained yields at the rate of about 900 lb. seed-cotton per acre. This, however, was considerably above the average, which was between 250 lb. and 300 lb. per acre.

(b) *Groundnuts.* A fair acreage of groundnuts was planted, and germination and stands were good. The crop withstood the dry spell at the beginning of the year to some extent. However, the combined effect of dry conditions at planting time and excessive soil moisture at time of reaping resulted in yields somewhat below those of the previous year. Of the two varieties planted, the Virginia Bunch and a runner type known as "Local," the latter yielded at the higher rate. This may be traced in large measure to the fact that the earlier maturing Virginia Bunch ripened during the heavy rains of October and November, when unfavourable weather restricted harvesting, and much of the crop rotted in the ground. The better plots yielded at the rate of about 2,000 lb. nuts in shell per acre. Yields, generally, could be appreciably improved if a closer spacing were adopted.

(c) *Tree Crops.* In relatively limited areas of the Island, fruit trees flourish and yield satisfactory returns. Nevertheless, on the majority of small-holdings, many of which are unfavourable for the economic cultivation of fruit trees, attempts are made to grow mangoes, avocado pears, citrus fruits, coconuts, breadfruit, golden apples and bananas. Indeed, there is a tendency to plant far more trees than these areas can conveniently accommodate. Conditions throughout the year were on the whole, reasonably good for tree crops, and supplies of almost all fruits, in season, were adequate.

(d) *Green Vegetables.* Supplies of most of the green vegetable crops, especially cabbage, tomatoes, carrots, beet, beans and lettuce, were good during the early months of 1954. These continued to be adequate right down to June, at which period the market was better supplied with green vegetables than had been the case for the corresponding period for several years past. This may be attributed to the fact that weather conditions were more favourable, and cultivation of these crops in irrigated gardens as well as on a field scale was more widely practised. The comparatively hot, dry conditions of July and August, followed by heavy rains in October and November affected vegetable crops adversely. During these months, apart from shallot, cucumbers and pumpkins, green vegetables were scarce and expensive. By Christmas time, supplies began to improve and almost all green vegetables were plentiful and easily available during the first few months of 1955.

Pests and Diseases: The practice among small cultivators of heavy ratooning of sugar cane resulted in the persistence of the root infesting mealy-bug. During the month of August a large number of holdings was inspected for this pest, and seventy-nine (79) were found to be infested. Other pests and diseases of cultivated crops reported, and on which the Peasant Agricultural Instructors

gave advice on measures of control included the following: the moth borer and root borer in sugar cane, the army worm in sweet potatoes, the pink bollworm and the cotton leaf worm in cotton, scale insects in fruit and ornamental trees, leaf-hoppers in beans, thrips in shallot, the white butterfly and bacterial black rot in cabbage and silvering disease and blossom-end rot in tomatoes. Efforts were made to encourage small-holders to provide themselves with suitable spraying equipment and insecticides in order to carry out early measures of control.

Livestock and Animal Husbandry : The difficulty experienced by butchers and speculators towards the end of 1953 in obtaining pigs for slaughter continued during 1954. The big demand at this period, created mainly as a result of popular interest in the preparation of hams and bacon on a domestic as well as a commercial scale, had only a limited effect in stimulating increased interest in pig breeding, and increasing the supply of young pigs available for fattening for slaughter. To meet this situation Government introduced, in October 1954, a pig subsidy scheme which provided for a free issue of balanced animal feed to every pig breeder in proportion to the number of each litter he produced and weaned. At the same time, improved methods of feeding and management were emphasised by the extension staff. Pig breeders were also encouraged to wean and sell their young pigs at a less tender age with a view to reducing the high mortality rate among this class of animals. The stimulus which the pig subsidy scheme gave to pig breeding, rather than pig rearing, soon became apparent in the increased number of applications for gilts produced at the District Agricultural Stations, instead of, as formerly, for barrows or merely "pigs." By the end of March 1955, there was evidence of a decline in the mortality rate, and a gradual increase in the pig population.

The general health and condition of all classes of livestock during the year were good. Some fodder difficulties were experienced during the period May to September when cane tops were no longer obtainable, and green fodder, owing to drought, was not generally available. Concentrated feed was adequate throughout the year.

The Peasants' Loan Bank: During the year 1954-55, there was a substantial increase in the number of loans granted by the Peasants' Loan Bank. This expansion of business was brought about mainly as a result of the Bank's activities being extended to include renters, in addition to owners of land. The financial assistance thus provided to a larger number of small-holders must have its effect in raising the general level of production. The following statement has been submitted by the Manager of the Peasants' Loan Bank:—

TABLE II

STATEMENT OF LOANS MADE DURING THE YEAR

	1952-53 (Nos.)	1953-54 (Nos.)	1954-55 (Nos.)
Number of loans granted during the financial year 1st June—31st May	719	839	1,534
Short term loan accounts opened during the previous financial year (for cultivation, manures, taxes) and still outstanding during current financial year ..	83	118	154
Long term loan accounts opened during the previous financial year (for repayment of Mortgages, Purchase of Livestock and Irrigation) and still outstanding during current financial year ..	343	400	498
	1,145	1,357	2,186
Less extensions of loans included in (1) above	15	16	13
Total number of accounts on books during the financial year	1,130	1,341	2,173
Amount of loans advanced	$69,341.00	$105,834.00	$144,903.00

Annual Competitions. Four competitions open to small-holders, and held in connection with the Annual Agricultural and Industrial Exhibition, took place during the year. These were as follows:—

(a) The Peasant Vegetable Garden Competition for which there were 34 entries;

(b) the Peasant Holdings Competition for which 38 entered;

(c) the Cotton Plots Competition—9; and

(d) the Soil Conservation Competition—12 entries.

The entries for these competitions were up to the standard of those of previous years, except in the Cotton Plots Competition in which the judges noted a slight decline. Adjudicators of these competitions were the Co-operative Officer and the Senior Peasant Agricultural Instructors.

The Soil Conservation Competition, which was held for the first time this year, was initiated by His Excellency the Governor who wished to see interest stimulated throughout the Island in the adoption of soil conservation measures. His Excellency offered the sum of $25.00 to be paid out at the Agricultural Exhibition as a special soil conservation prize. The Agricultural Society offered a second prize of $12.50. The awards were to be made to the small-holders who had carried out and maintained the most effective measures towards the conservation of soil and water on their holdings, having regard to the acuteness of the problem on the particular holdings and the extent to which the measures were effective. The number of small-holders qualifying for entry to this competition was relatively small, but the standard of the entries was good.

B. The Work of the Department's Agricultural Extension Services.

Staff. The Deputy Director of Agriculture continued in executive charge of the extension services. The Co-operative Officer who had acted in the post of

first Senior Peasant Agricultural Instructor (a title later changed to Principal Peasant Agricultural Instructor) since September 1951, continued throughout the year in this post, in addition to carrying out the duties of his substantive post of Co-operative Officer.

Messrs. C. L. Bolden, C. T. Grant and G. U. Taylor, temporary Peasant Agricultural Instructors, who had been appointed to fill the temporary vacancies created by the absence at the Eastern Caribbean Farm Institute of three members of staff, after a period of training, were assigned to district work in September 1954.

Mr. G B. Pilgrim, Peasant Agricultural Instructor in charge of Bullen Agricultural Station, retired from the service on reaching the age limit in December 1954. Mr. C. A. Riley succeeded him as officer-in-charge of this station.

Mr. E. S. Brathwaite, while still attending the course at the Eastern Caribbean Farm Institute, was transferred on promotion to the post of Manager of the Mental Hospital Farm.

Mr. F. M. Cummins was promoted in January 1955 to the post of Assistant Livestock Officer at the Central Livestock Station. He was succeeded as Instructor-in-charge of the Haggatts Agricultural Station by Mr. H. DaC. Sealy.

Mr. C. V. Drayton, Peasant Agricultural Instructor, resigned from the service in January 1955.

In February 1955, Messrs, L. T. Talma and C. D. Spooner returned after successfully completing the first training course held at the Eastern Caribbean Farm Institute. They were put in charge of two of the three Senior Peasant Agricultural Instructors' Areas into which the Island was then divided; Mr Talma in charge of the Eastern and Mr. Spooner the Northern Area. Arrangements were made for the services of the three temporary Peasant Agricultural Instructors to be retained.

The Peasant Agricultural Extension Staff at the end of March 1955, therefore, consisted of a Principal Peasant Agricultural Instructor, three Senior Peasant Agricultural Instructors, nine Peasant Agricultural Instructors and three temporary Peasant Agricultural Instructors.

Visits to Small-Holdings: The Peasant Agricultural Instructors visited 9,132 small-holdings during the year, as compared with 10,832 in 1953—54. This drop in the number of visits paid was due to the large number of changes in the Peasant Agricultural Extension Staff, and the fact that two Instructors were absent on long leave during the year. The Peasant Agricultural Instructors assisted the Co-operative Officer in arranging and conducting meetings of groups of small-holders, especially in connection with efforts to promote co-operative irrigation societies. A considerable amount of work of an advisory nature on all aspects of crop and animal industry was undertaken, and small-holders given assistance in solving their soil conservation, irrigation, pest and disease control, livestock and agricultural problems in general.

School Gardens. A great deal of attention continues to be devoted to school gardens and to ensuring that they play their proper part in creating among the pupils the right attitude to agriculture. During the year 1954—55, 359 visits were paid to school gardens by the extension staff, as compared with

288 the previous year. Owing to hot, dry conditions, there was some delay in the cultivation and planting of school gardens at the beginning of the second term. On the whole, however, the weather was favourable for vegetable gardening, and the all-round standard of those school gardens was satisfactory.

Forty-two (42) gardens were entered for the Annual School Vegetable Gardens Competition, which took place as usual. The judges were the Co-operative Officer and the Senior Peasant Agricultural Instructors. Two additional heads, namely, (a) Soil Conservation and (b) Accounts and Records, were added as a basis for assessing the merits of the entries for this competition. By the end of the year, as a result of co-operation between the teachers and pupils on the one hand, and the extension staff of this Department on the other hand, the majority of these school gardens were laid off on the contour, and plans were in hand for dealing with the remainder. Specimen copies of the types of simple accounts and records to be kept were circulated, and efforts made to impress on the pupils that the keeping of proper records and accounts was an essential function of any business and that the vegetable garden was no exception. Competitors were notified that, beginning in 1955, it was proposed, in addition to the eight cash prizes, to offer for competition a perpetual challenge shield which would be awarded to the school gaining the first place in the competition each year.

SOIL CONSERVATION AND CULTIVATION:

A considerable amount of work was done in advising small-holders on the need for soil conservation, particularly in the hilly districts, including the Scotland Area, where there is an acute soil erosion problem. As a result, a number of soil conservation projects was undertaken on the holdings of the more progressive farmers and on school gardens. The Peasant Agricultural Instructors also supervised the laying out of fields on plantations. Many of these projects involved the construction of key contour bunds at 3—4-ft. vertical intervals in fields cultivated on the cane-hole system.

During the year, a pilot tractor-ploughing scheme for small-holders was started on a limited area, mainly in the parishes of St. Philip and Christ Church. The scheme was experimental and was intended to test out the economics of tractor-ploughing under the special conditions of very small plots, often of shallow rocky soil, so common a feature of small-holdings in Barbados. The scheme was also designed to provide information regarding the types of tractors and implements best suited to these peculiar conditions. As a result of this scheme, several more small-holders than usual were able to make use of mechanical cultivation, and to have their holdings cultivated on the contour.

The Peasant Agricultural Instructors supervised 112 soil conservation projects, comprising 2,328 rods of contours, and protecting an area of 145 acres.

C. The District Agricultural Stations.

The six District Agricultural Stations continue to function principally as centres for demonstrating to small farmers suitable mixed farming systems based on sugar cane as the main cash crop. Experimental work is reduced to the bare minimum, as the Instructors in charge of these stations, owing to their various other duties, cannot devote the time and attention necessary for the careful supervision and detailed records which such work requires. Experiments during the year were restricted mainly to spacing and cultivation trials

conducted with food crops of yams, sweet potatoes and cow peas. Variety trials were also carried out in the vegetable garden in an attempt to find varieties suitable for the hot, wet months. In addition, the peasant investigational units established at two of the stations, namely, "Sayes Court" and "The Home", were continued. The provision of stud service facilities and of young pigs for sale for breeding continued to form an integral part of the functions of these stations.

The Stud Service:

The services of stud bulls (artificial inseminations), buck goats, ram sheep and boars continue to be provided at the District Stations. Bulls are no longer kept at these stations, semen for artificial insemination being delivered three times a week from the Central Livestock Station. There was an unaccountable drop in the number of artificial inseminations carried out at the Stations, the total for the year being 646, as compared with 813 in 1953-54. On the other hand, boar services increased from 780 in 1953-54 to 1,310 in 1954-55. This substantial increase in the number of boar services gives some measure of the impetus to pig breeding provided by the pig subsidy scheme, already referred to in this Report. The total number of services of all kinds at the six stations for the year (not including free return services) was 3,897, as compared with 3,587 in 1953-54.

Table III below gives the total number of services of each kind paid for at the stations during the year 1954-55:—

TABLE III.

Number of Services paid for during the Year ending March 31, 1955.

Station	Bulls (Artificial Insemina-tions)	Buck Goats	Ram Sheep	Boars	Total
The Home (St. Philip) ..	102	123	35	450	710
Sayes Court (Ch. Ch) ..	33	128	39	210	410
Groves (St. George) ..	348	260	356	386	1,350
Jerusalem (St. Peter) ..	82	197	95	75	449
Haggatts (St. Andrew) ..	33	160	123	42	358
Bullen (St. James) ..	48	333	92	147	620
TOTAL	646	1,201	740	1,310	3,897

Financial Returns of Stud Service:

The stud service continues to be heavily subsidised. During the year, there were appreciable increases in expenditure, mainly as a result of increases in the cost of labour. At the same time, service fees remained the same, namely bulls (artificial inseminations) 72 cents, buck goats and ram sheep 18 cents and boars 48 cents. The tendency, therefore, has been towards a widening of the gap between revenue and expenditure, or increased subsidisation of the stud service.

Breeding Sows:

The policy of keeping sows on the stations in order to provide young pigs for sale for breeding was continued. The difficulty experienced in the past in satisfying the big demand for these young pigs was considerably increased

as a result of the added incentive to pig breeding produced by the pig subsidy scheme. Following the introduction of this scheme, there was an appreciable increase in the number of applications received at the stations for young pigs, especially sows. Owing to limited accommodation, only a slight increase in the number of breeding sows kept on the stations was possible. Fortunately, the private pig breeder, who is also supplied, where necessary, with stud boars from the stations, has been encouraged, as a result of the scheme, to produce more young pigs for distribution and for increasing the pig population of the Island. The aim of the pig subsidy scheme is, therefore, being achieved.

THE STATIONS AS A WHOLE

The activities carried out on the six District Stations, as pointed out in previous Annual Reports, may be classified as follows:—

(a) Demonstration or Commercial:

This includes the demonstration of a mixed farming system with sugar cane as the main cash crop, intensive vegetable cultivation, the management at some stations of a small banana plot and, at two of the stations namely, "Sayes Court" and "The Home", the operation of a small dairy unit. At four of the stations, situated in the low and intermediate rainfall areas, irrigation is practised.

A carefully planned rotation system was introduced in the vegetable gardens during the year in order to provide for sustained yields of all the crops in the rotation. The area of the vegetable garden at one of the stations, however, is relatively small, and the amount of any crop available at a time is limited in consequence. Apart from this, the system is working satisfactorily and has resulted not only in a wider range of crops being available at any time throughout the year for supplying hucksters and consumers, but also in reducing the fluctuations in revenue from month to month which were a feature of the old casual system of cropping.

(b) Investigational or Experimental:

Included here are the peasant investigational units at "Sayes Court" and the "Home", and small-scale experiments, such as cultivation, spacing, manurial and variety trials which may be undertaken from time to time.

During the year, spacing and cultivation trials were carried out with crops of yams, sweet potatoes and cow peas. Three systems of cultivation were used, namely, cane-holes at 4½-ft. lining, 5-ft. contour banks, and 3-ft. contour bridges. It is proposed to repeat these trials next year. Variety trials were also carried out, mainly in the vegetable garden, with crops of soya beans, cabbage, lettuce and bush beans.

(c) Subsidised Activities:

These include the stud services and breeding sows. In addition, at some stations, heifers were reared during the year on a subsidised basis.

(d) Capital Works:

Included under this head are extensions or major repairs to buildings, roads, yards, etc.

FINANCIAL STATEMENT FOR THE STATIONS AS A WHOLE

Following is a summarised statement of cash revenue and expenditure for the six District Stations covering the activities referred to above:—

TABLE IV.

Statement of Cash Revenue and Expenditure for the Year 1st July, 1954 to 30th June, 1955.

Item	The Home	Sayes Court	Groves	Jerusalem	Haggatts	Bullen	Total 1954–55	Total 1953–54
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Expenditure	11,924.43	7,999.43	8,588.73	11,790.37	6,407.85	7,809.95	54,520.76	44,957.46
Revenue ...	8,855.26	4,468.73	4,817.05	2,951.18	1,524.29	3,015.44	25,631.95	22,973.18
Difference ...	3,069.17	3,530.70	3,771.68	8,839.19	4,883.56	4,794.51	28,888.81	21,984.28

Expenditure shown for 1954—55 includes capital expenditure incurred as a result of renovations and extensions to buildings, particularly to "Sayes Court" and "Jerusalem". Such expenditure should normally be spread over a period of years. Also included is the cost of extensions to the irrigation systems, which again is not a fair charge against a single year's recurrent expenditure. The above figures, therefore, do not present a true picture of the total expenditure for the year. The biggest single item of expenditure is labour, and a comparison of labour costs for 1954—55 with those for the previous year shows that increases under this head have been very appreciable.

Revenue for the year shows an increase of $2,658.77 over that for 1953—54. This was brought about mainly as a result of improved yields consequent on more intensive cropping and better irrigation facilities. The demonstration or commercial side of the stations' activities—mainly the cultivation of sugar cane and food crops and the management of the dairy units—continues to improve. It is difficult, however, for revenue to keep pace with the steady rise in recent years in the costs of production, especially since, in an effort to keep down costs to the small-holder and consumer, there has been no comparable increase in the prices at which goods and services are provided on these stations.

It would be a fair summing up of the position to state that, compared with the figures for 1953—54, those for the year under review show a substantial increase in total revenue. At the same time, there has been no significant widening of the gap between the true total expenditure and total revenue—a gap which must be maintained if these stations are to continue to provide adequately those essential services which cannot readily be measured in terms of money.

SECTION II.

CO-OPERATION

By

C. A. E. BECKLES

Co-operative Officer.

Staff:

The Co-operative Section of the Department continued on a care-and-maintenance basis handicapped by inadequate and part-time staff. The staffing position was the same as it was the previous year, and indeed since 1952, with the Director of Agriculture as temporary Registrar of Co-operative Societies, the Co-operative Officer, most of whose time was occupied in carrying out the duties of Principal Peasant Agricultural Instructor, and a part-time Audit Clerk. In the circumstances, propaganda and educational work, which is so essential to the development of a healthy co-operative movement, was severely restricted.

Registered Societies:

Three new societies were registered during the year and none was liquidated. The number of registered societies at 31st March, 1955, then, was 10. These were as follows:—2 Savings Societies, 1 Consumer Society, 4 Marketing and Producers' Societies, 2 Thrift and Credit Societies and 1 Thrift Society. Some information regarding the work and general progress of these societies is given in succeeding paragraphs of this Report.

(a) *Savings Societies.* Savings Societies are those in which the members make small regular savings, which are credited to their personal accounts, and attend meetings to learn how to operate a co-operative society. When they have learnt this technique, they then consider the type of society into which their savings society should be converted in order to meet their common economic needs. Savings societies are, therefore, of a temporary nature. One savings society was registered during the year. Its members consist mainly of urban wage-earners who, during the year, made satisfactory progress in their study group activities as well as in the practice of thrift. The other savings society —a rural one—was registered since 1952, but made little progress during the year.

(b) *Consumer Societies.* The one registered Consumer Society was almost altogether inactive during the year. The failure of the green-grocers' shop, the initial effort of this group, brought about by poor management, credit sales and lack of membership support, continued to dampen the spirit of members. Consideration will have to be given to cancelling the registration of this society.

(c) *Marketing and Producers' Societies.* There was no increase in the number of Marketing and Producers' Societies during the year. The principal function of the four societies of this type continued to be the co-operative marketing of their members' cane crop in accordance with the terms of the Domestic Sugar Agreement. During 1954, these societies marketed a total of 4,455 tons of cane, for which they were paid a gross price of $70,472, as compared with 3,790 tons valued at $60,790 in 1953. The additional price, above the basic price, obtained by these societies as a result of co-operative marketing amounted

to $779.12, as against $658.17 in 1953. As in previous years, one of these societies, in addition to meeting the marketing needs of its members, also supplied their fertiliser requirements as well. Another continued to handle the problem of transporting its members' canes to the factory by means of a motor lorry which the society had purchased in 1953.

(*d*) *Thrift and Credit Societies with Limited Liability.* One Thrift and Credit Society with Limited liability, or a Credit Union, was registered during the year. This society had been in existence for about seven years and had built up a sound reputation. The other society of this type which had been converted from a Savings Society in 1953, completed another successful year, during which it doubled its share capital and made loans amounting to well over $1,000. These two societies at the end of March 1955, had a combined membership of 130, share capital amounting to $3,600, and had out on loan to their members $2,250. This type of society appears to be taking root, especially in the urban areas, where it seems capable of meeting a real need.

(*e*) *Thrift Societies.* Thrift Societies are designed to meet the thrift needs of salary earners by providing a safe and convenient means whereby savings may be made regularly and systematically during employment. A fixed percentage of the member's salary (monthly or weekly) is set aside and credited to his personal account. This normally cannot be withdrawn, except for something in his permanent interest. Thrift Societies also make loans to their members, usually up to a maximum of 75% of the member's "ordinary" savings, and thus fall within the category of credit. There seems to be considerable scope for the organization of this type of society among groups of salary earners, such as civil servants and teachers, who work together in the same organization and are prepared to solve their thrift and credit needs by means of self-help. The first society of this type was organized during the year among the staff of the Department of Science and Agriculture and was registered in October, 1954. By March 31, 1955, that is, in 5 months, the membership of this society had reached 35 and "ordinary" savings amounted to close on $2,000.

(*f*) *Other Societies.* Several attempts were made during the year to organise groups of small-holders into Co-operative Irrigation Societies. Eventually, the Selah Co-operative Irrigation Society was formed at Harrison in St. Lucy. This group elected its provisional committee of management and began collecting entrance fees and first contributions to share capital in January, 1955. Up to the end of March, 1955, the society had not been registered nor had irrigation operations begun, but the prospects were encouraging. Much preliminary work was being done by officers of the Department in promoting co-operative education among the members of the group and assisting them in laying the foundation for the effective management of this type of society. There are no Craftsmen's Societies or Women's Societies. Women as well as men are members of most of the other societies.

Co-Operative Education and Propaganda:

(a) *Local Co-operative Training Course.* A short training course in Principles of Book-keeping arranged by the Co-operative Section of the Department took place during October and November 1954. The course was well attended by members of the three societies in St. Michael to whom it catered. It is proposed to hold other courses in future with a view to improving the knowledge of co-operators in the keeping of accounts and the general management of their respective societies.

(b) *Co-operative Library.* In order to encourage co-operative education, a co-operative library was started at the Department in January 1955. This library contains standard books as well as pamphlets on various aspects of Co-operation. Publications are loaned free of cost, and so far, several members of co-operative societies have been making use of this means of improving their knowledge of co-operative principles and practice.

(c) *Educational Campaign.* A campaign sponsored by the Shamrock Co-operative Credit Union, aimed at promoting greater interest in Co-operation and taking the form of a series of lectures, was held in January and February 1955. This campaign received the full support of the Department, two members of the staff of which, namely, the Co-operative Officer and the Audit Clerk, participated. The Shamrock Co-operative Credit Union deserves to be congratulated on the success of this campaign which proved to be very stimulating and instructive and at which a remarkably good attendance was maintained throughout the series.

(d) *Co-operative Seminar.* A seminar on economic, social and educational problems of the Caribbean region was held at Christiana, Jamaica, under the auspices of the International Co-operative Alliance in January 1955. Miss Gloria Selby, Treasurer of the Shamrock Co-operative Credit Union, was selected by Government to represent this Colony at the seminar. She reported very favourably on her impressions of the seminar and the expansion in experience and knowledge of Co-operation which she derived from her visit.

(e) *Co-operators' Day.* In common with the rest of the co-operative world, Barbados celebrated International Co-operation Day, or Co-operators' Day, on the first Saturday in July 1954. The celebrations were marked by a function held at Welchman Hall, St. Thomas, and sponsored by the Welchman Hall Co-operative Marketing Society. The function was presided over by the Hon. C. E. Talma, Minister of Agriculture, Lands and Fisheries, and the principal speaker was Mr. E. C. M. Theobalds, then acting Director of Education. As usual, reports were presented on the work of the various societies for the previous year.

(f) *Visits and Lectures.* Mr. Arnold Bonner, Lecturer at the Co-operative College in Loughborough, England, visited the Island under the auspices of the British Council in April 1954. He delivered a number of lectures on Co-operation to meetings sponsored by various co-operative societies as well as other interested groups. These lectures resulted in a better understanding of co-operative principles and practice and served as a stimulus to local co-operative development.

Fr. John P. Sullivan, S.J., Director of the St. George's Extension College and Managing Director of the Credit Union League of Jamaica, paid a short visit to the Island in May 1954. Fr. Sullivan has considerable practical experience in Co-operation, especially Credit Unions, and is the author of some works on the subject. During his short visit he attended the annual general meeting of the Shamrock Credit Union and also a specially convened meeting of potential leaders and other persons interested in the movement.

Mr. R. H. Gretton, Agricultural Co-operatives Specialist of the Food and Agricultural Organisation of the United Nations, paid a three-day visit to the Colony in April 1955. Mr. Gretton's visit was in the course of a reconnaissance survey which he was carrying out in the various territories served by the Caribbean Commission, in connection with a Technical Meeting on Co-operatives in the Caribbean to be held early in 1956. This Technical Meeting, like

the previous one held in Trinidad in 1951, was to be sponsored jointly by the Caribbean Commission and F.A.O. A full programme was arranged for Mr. Gretton's brief visit. This enabled him to meet technical officers and others concerned with co-operative development in the Colony, as well as to hold discussions with co-operative groups, and to address a public meeting on "The Work of F.A.O. in relation to Co-operatives."

Audit and Supervision Fund:

It was decided that each society during its first year of operation would be exempt from contribution to the Audit and Supervision Fund, provided for in Rule 39 of the Co-operative Societies' Rules, 1950. Contributions from other registered societies to this fund for the year 1954-55, amounted to $12.00. This, together with the sum of $7.20 brought forward from 1953-54, accounted for a total contribution to this fund of $19.20 to 31st March, 1955. There was no expenditure from this fund up to the end of the year 1954-55.

Departmental Expenditure:

Expenditure incurred in connection with the Co-operative Section of the Department for the year 1954—55 is shown below:—

Personal emoluments (including C.O.L.A.)	$4,044.00
Travelling	450.00
Office equipment, stationery and incidentals	232.56
TOTAL	$4,726.56

Financial Position of Co-operative Societies:

Following is a summarised statement showing the financial position of registered Co-operative Societies up to 31st March, 1955:—

Statistics on Registered Co-operative Societies up to the 31st March

Year	No. of Societies	Membership	Share Capital Savings	Turnover	Gross Profits	Net Profits	Reserve Funds
			$	$	$	$	$
1952-53	6	380	2,865.73	40,779.32	533.88	151.28	206.33
1953-54	7	413	3,537.41	40,377.92	1,020.63	364.30	652.12
1954-55	10	500	7,677.97	55,500.00	1,062.86	327.66	694.41

SECTION III.

SUGAR CANE BREEDING AND SEEDLING TESTING

By

B. DEL. INNISS,

Botanist, B.W.I. Central Sugar Cane Breeding Station.

Sugar Cane Breeding — B.57′ Series

Sugar cane breeding was carried out at Groves Agricultural Station from October 1954 to January 1955. Arrowing was fairly good and all lanterns were in use, some of them being used twice. One hundred and sixteen crosses were made, as well as twenty-four selfs and sib-crosses for the cytogenetics research programme. Germination was the poorest on record. It is estimated that a total of only forty thousand six hundred and sixty-two seedlings germinated, all of which were potted. Of these, eleven thousand, five hundred and sixteen singles and five thousand, three hundred and nineteen bunches, of five to ten seedlings per pot, survived and were planted in the Field Nursery.

Details of the crosses made and seedlings raised, potted and planted in the Field Nursery are available in the Annual Report of the B.W.I. Central Sugar Cane Breeding Station.

Reaping the First Year Seedling Trials — B.55′ Series

Three hundred and seventy-one seedlings were selected from the First Year Seedling Trials of the above series, details of which are tabulated in the above-mentioned Annual Report. These seedlings were planted in multiplication plots at Codrington Station. The plots grew well under irrigation.

Seedlings of the B.54′ Series

These were multiplied at Codrington and subjected to a minor selection in October 1954. The selected seedlings were planted in Second Year Seedling Trials at the low rainfall station, Codrington (two trials) and in duplicate trials at the high rainfall stations, Colleton and Todds.

Seedlings of the B.53′ Series

These were cut as plant canes at the low rainfall station, Codrington (two trials) and in duplicate trials at the high rainfall stations, Guinea and Henley. Twenty selections were made. The most promising will be tested further in Barbados, and in October, Colonies which contribute to the Station will receive selected consignments. Particulars of the performance of the selected seedlings are given in the Annual Report of the Station.

Seedlings of the B.52′ Series

These were cut as first ratoons in the Second Year Seedling Trials at the high rainfall stations, Clifton Hall and Fisherpond. Selected seedlings of this series were planted in Third Year Seedling Trials in November 1954.

Seedlings of the B.51′ Series

Seedlings of this series were cut as plant canes in Third Year Seedling Trials during the crop season. Two seedlings, B.51353 and B.51355, gave

exceptionally heavy cane tonnages, but their juice quality was so poor that they cannot be considered for commercial cultivation.

B.5124 and B.51321 both gave fairly good yields of plant cane of very good juice quality. However, unless their ratooning is exceptionally good, it is unlikely that they will achieve commercial status.

Seedlings of the B.50′ Series

The seedlings of this series were cut as first ratoons in Third Year Seedling Trials.

B.50112 has performed well in these trials. It has a good juice and has given good yields of plant and ratoon cane. However, it is unlikely to become a commercial variety on account of the outstanding performances of B.4744 and B.49119.

B.50377 has an outstanding juice, trashes well and possesses exceptional vigour. However, it flowers so freely and early that it cannot be recommended for planting on a commercial scale in Barbados.

Seedlings of the B.49′ and Earlier Series

The seedling, B.49119, which was selected as a ratoon and was included in these trials, has performed sufficiently well, particularly in the ratoon trials, to warrant its liberation for trial on a commercial scale. It has quite a good juice and trashes easily. Its main drawback is that it tends to flower freely as a plant cane particularly in the high rainfall areas.

B.4744 has been outstanding in Select Seedling Trials in the intermediate and high rainfall areas. It does not stand dry conditions very well, and is definitely unsuited to the sandy soils of St. James and St. Peter.

B.45151 has performed very well on valley soils of the intermediate rainfall area and on the red soils of the high rainfall area. It is a powerful ratooner and has an exceptionally good juice, especially when the canes are ripe. Further, it appears to stand up well to periods of drought.

B.46364 and B.4738 have not been so outstanding in trials. Both have moderately good juices. B.46364 appears to be very resistent to drought conditions while B.4738 would undoubtedly give better results if it did not flower so freely in the plant cane crop.

B.47380 has an excellent juice, but has failed to give the cane tonnages necessary to make it a competitor for commercial cultivation.

B.47419 has performed well in the intermediate and high rainfall areas. Its juice quality is not as good as that of B.4744, but fibre in cane is considerably less, so that sucrose in cane is high as a rule.

Details of the trials are available in the Annual Report of the B.W.I. Central Sugar Cane Breeding Station.

SECTION IV.

IRRIGATION

By

A. D. HERBERT

Irrigation Officer

1. Small-Holdings

During 1954—55, the operation of the Peasant Irrigation Assistance Fund was continued on a much reduced scale, as there were few applications for assistance.

The Irrigation Officer paid 12 visits to peasant holdings in connection with irrigation. Assistance was given to 8 peasants to instal irrigation units.

The owners of a group of adjacent small-holdings at Crab Hill, St. Lucy, represented their desire to undertake irrigation on a group basis. It was necessary to conduct exploratory drilling for water on their lands. Sheet water was located beneath the extreme western edge of their group of holdings. The Co-operative Officer arranged to instruct them how to form themselves into an Irrigation Co-operative, so that they would negotiate for assistance from the Irrigation Board.

2. Plantations

The owners of 4 plantations requested assistance. Visits were paid and irrigation plans prepared. One of these plantations has installed irrigation and another has almost completed its preparations to start irrigation of 110 acres. The other two were unable, through lack of sufficient funds, to instal irrigation units.

3. Agricultural Stations

Irrigation was continued on 6 stations.

Periodic visits were paid by trained mechanics for the purpose of repairing and maintaining the pumping plants.

(a) Codrington Agricultural Station:

The electric submersible pump continued to give trouble-free service. The large booster pump was repaired and replaced.

(b) Central Livestock Station:

Fodder production was maintained by means of the original irrigation system. This was also used to irrigate a limited area under sugar cane and to supply water for the experimental plots in Middle 11 Acre field.

A new high pressure water system, with storage tank, was installed at the Central Livestock Station. Water for this tank is supplied from the irrigation system at a considerable saving.

(c) The Home:

The submersible pump broke down in November 1954. It was quickly repaired and returned to service.

The irrigation mains were replaced with aluminium pipe of 4" diameter.

(d) Sayes Court:

High salinity of the water continues to cause damage to the pumping plant. Frequent repairs are necessary.

(e) Jerusalem:

Irrigation continued with water supplied by the Waterworks Department.

(f) Groves:

A limited amount of irrigation was done to the Cane Breeding Station's plots with water supplied by the Waterworks Department in 1954. This supply was not available in 1955. It was therefore necessary to clean and sink the old Groves well. The Test pump was installed in it, and water pumped to irrigate the Cane Breeding Station's plots.

A trickle irrigation system was installed in the vegetable garden.

(g) Mental Hospital Farm:

Funds were provided in 1954 to install an irrigation system to irrigate fodder crops for the dairy cattle. The well was dug in May 1954. On completion, the water was tested for volume and salinity. When they were found to be satisfactory, the pump was ordered. The delivery of this was delayed. It eventually arrived and was installed in March 1955. The necessary switch room had been built at an earlier date.

4. The Water Control Board

The Board held no meetings during the year.

A limited number of applications to sink wells was received.

5. The Irrigation Board

The Board held 5 meetings during the year. Members visited the drilling unit at Crab Hill, and irrigation stations at the Hope, Pine and Sandy Hill. The time of the Irrigation Officer, during 1954—55, has been mainly taken up putting into effect the decisions of the Board.

Engine rooms and foremen's quarters were built at Sandy Hill and the Hope. Irrigation pipe and fittings were imported and installed at these stations. Pumping equipment was installed at Sandy Hill in August 1954 and at the Hope in September.

Irrigation was started at the Pine in April 1954, and at Sandy Hill and the Hope in January 1955.

Two irrigation experiments were conducted at the Pine.

Exploratory drilling was conducted, with the co-operation of the Waterworks Department, in St. Lucy. Two elevated sheet water basins were found and test-pumped.

Equipment was hired to perform certain drainage and cultural operations at Sandy Hill.

6. Visitors and Visits

His Excellency inspected the drilling operations at Crab Hill and building operations at the Hope.

Sir G. Clay inspected drilling operations at Roaches and irrigation at the Hope.

Business visits were paid by representatives of 3 firms supplying irrigation pipe and equipment.

The Irrigation Officer visited Jamaica for a week in August 1954 to obtain information for the Irrigation Board. Valuable information was obtained and has been suitably used.

The Irrigation Officer's services were loaned to the Government of St. Vincent for a week in March 1955. He visited Mt. Bentinck and designed an irrigation system for that sugar plantation.

SECTION V.

ANALYTICAL AND TOXICOLOGICAL

By

N. CARMICHAEL,

Government Analyst

During the year under review, a toxicological wing was added to the laboratory.

The Government Analyst attended the courts on several occasions in the capacity of an expert witness. One of these occasions was before the Court of Chancery in connection with a civil action brought by a private individual regarding alleged nuisance caused by bagasse fly-ash.

An Agricultural Chemist assumed duties in December 1954, and this had the effect of relieving the Analyst of all extra laboratory duties performed by the latter on behalf of this officer.

A survey of milk covering the period 1953—1955 inclusive has been completed and a full account appears elsewhere. It is hoped that the data collected will assist in bringing into action the much needed legislation with regard to presumptive standards respecting the sale of milk.

A total of 1,128 samples were analysed over the period April 1954 to March 1955, for various Government Departments, business firms and private individuals. This represents an increase of 108 samples over the previous financial year. The source and distribution of all samples is supplied in Table I along with a comparison over the five-year period 1950—1955:—

TABLE I.

Distribution of Samples over the 5-year period 1950—1955

	1950	1951-52	1952-53	1953-54	1954-55
Police Department ..	348	408	274	362	324
H.M. Customs ..	105	78	74	131	172
Parochial & Sanitary Dept.	357	330	475	395	424
Agricultural Society	28	25	5	6	85
Other Departments ..	38	14	27	29	28
Private Individuals ..	83	83	130	97	95
TOTAL	959	938	985	1,020	1,128

The practice in the past of including Agricultural analyses in this table has been discontinued. The necessary information will be given by the Agricultural Chemist in his section of this report.

Table II comprises samples examined for the Police Department:—

TABLE II.

Samples examined for the Police Department

Sample	No.
Criminological & Forensic	148
Milks	99
Butters & Cooking Oils	35
Rums	26
Tea, Coffee, Cocoa, etc.	13
Feeding Stuffs	3
TOTAL	324

Criminological & Forensic: Exhibits submitted under this head are from the C.I.D. and have to do with problems that arise in connection with the administration of justice.

TABLE III.

Exhibits from the C.I.D.

	Cases	Exhibits
Suspected poisoning	4	8
Attempted Suicide	2	24
Sudden Deaths	9	65
Throwing of Corrosive Liquids	5	18
Firearms Identification	—	—
Unlawful Possession of Firearms	—	—
Driving under Influence of Alcohol	1	1
Suspected Arson	4	10
Drug Identification	2	14
Explosives	—	—
Administering Powdered Glass	1	1
Coins & Counterfeiting Exhibits	2	7
TOTAL	30	148

Sudden Deaths etc.: A total of 89 exhibits in connection with 11 cases of sudden deaths were examined. Poisons were identified in 3 out of the 11 cases and verdicts returned by the Coroner's jury were 2 deaths by suicide and one by misadventure.

In one of the suicidal cases, 5 grains of Nembutal, a short acting hypnotic drug belonging to the Barbituric family of narcotic poisons, were extracted from the vital organs examined. In addition, a stone weighing 20 grains was observed in one of the kidneys during the process of toxicological examination.

The other suicidal case should be equally interesting from a pathological point of view. It turned out that the victim drank "Atlas A" wood preservative, a substance commonly used in Barbados for protecting timber used in building works, from attack by termites and other bugs. Arsenic extracted from the Viscera amounted to 1½ grains, the bulk of which was located in the kidney and liver with traces in the blood. From a wine glass containing a portion of the vomitus, 4½ grains of arsenic were extracted and a further quantity of 1½ grains was found on a handkerchief soaked in another portion of the vomitus, giving a total of 5.8 grains in the vomitus alone. This together with the amount found in the organs showed that at least two lethal doses had been swallowed. Further supporting evidence of arsenical poisoning was shown by the condition of the stomach in which organ the blood vessels were distended like whipcords and the mucosa badly eroded. In addition, a further quantity of the wood preservative was found at the victim's bedside in a bottle. It contained 4 lethal doses (12½ grains) of the poison. Death by suicide while of unsound mind was returned with no difficulty by the Coroner's Jury.

The remaining case of sudden death was that of a three year old child. The latter while playing in the basement of a house innocently placed a stone in its mouth. The stone was coated with Paris Green (Copper-Aceto-Arsenate). In this case, only 1-20 of a grain of Arsenic was found in the vital organs submitted for analysis. Nevertheless, this quantity, small though it was, yet assisted the Jury in arriving at its verdict of death by misadventure.

Driving under Influence of Alcohol: In such cases, urine and/or blood are submitted in order to substantiate clinical findings. During the year under review, there was only one such case and the result of analysis was positive. 2.6 parts per 1,000 of alcohol in the urine equivalent to a minimum blood alcohol content of 2.1 parts per 1,000 confirmed clinical findings.

Suspected Arson: Kerosene Oil (petroleum) was identified in all four cases.

Adulterations under Food & Drugs Act: Ten (10) out of ninety-nine (99) samples of milk and two (2) out of twenty-six (26) samples of rum showed adulteration by the addition of water.

The Customs Department submitted a total of 172 samples for classification. Their distribution is given in Table IV:—

TABLE IV

H. M. Customs

Sample	No.
Butters & Cooking Oils	2
Milks	17
Petroleum	146
Rums, etc.	6
Miscellaneous	1
TOTAL	172

Samples examined in this connection were mainly for the assessment of duty on imported articles.

Food & Drugs: The maintenance of proper standards respecting the sale of milk, food stuffs, etc., was mainly carried out by the Parochial and Sanitary authorities who submitted a total number of 424 samples 410 of which were milks.

Five (5) out of the 410 samples of milk examined in this respect showed adulteration by the addition of water; the remainder comprised seven (7) samples of B.C. Disinfectant for Chlorine content, two (2) samples of canned fish, two (2) Bovine livers and three (3) samples of beef to test fitness for human consumption.

The number of samples examined for private individuals this year was 95 as against a total of 97 for the previous year. Their nature is indicated in Table V:—

TABLE V

PRIVATE INDIVIDUALS

Sample	No.
Butters, Margarine & Cooking Oils	6
Fertilisers	15
Feeding stuffs	3
Milks	18
Waters	8
Rums	15
Petroleums	2
Forensic	1
Viscera	1
Unclassified	26
TOTAL	95

Samples unclassified comprised:—Four (4) solutions, sulphuric acid, methyl orange, o-tolidene, phenol-phthalein; a bottle examined for calibration; a sample of sand for sodium chloride content; two (2) cables from the Barbados Electric Supply Corporation; a sample of gas from a yacht; samples of Bagasse Fly-ash and a quantity of perfume in which connection foul play was suspected.

The fly-ash referred to above was in connection with a civil action brought by private individuals against a local sugar factory on a charge of creating a "nuisance". The Government Analyst was summoned before the Court of Chancery to give expert evidence as to whether material collected from a number of houses in the area was begasse fly-ash of the nature and composition produced by local sugar factories. An injunction was granted in favour of the complainants.

Work for the Department of Education

In July 1954, the Government Analyst undertook for the Department of Education, all work of a preparatory and supervisory nature in connection with the practical examinations in Chemistry and Physics of the Oxford & Cambridge examinations at Advanced and Scholarship levels. Individual accommodation was provided for 14 candidates in Chemistry and 11 in Physics.

In December of the same year, similar work was done in connection with the London Intermediate B.Sc. examination held locally.

The New Toxicological Laboratory

A new Toxicological Laboratory which is an extension of the existing Government Laboratory and was designed and set up by the Government Analyst, was officially opened by the Minister of Agriculture, Lands and Fisheries on the 3rd December, 1954.

SECTION VI.

CHEMISTRY

By

J. BOLTON,
Agricultural Chemist.

The writer assumed his duties as Agricultural chemist in December, 1954, succeeding Mr. J. B. D. Robinson who resigned in September, 1952. Since 1952, several field experiments have been completed and three projects of particular interest to the Agricultural Chemist have been carried out by different organisations. The field experiments have now been analysed and the results will be reported in full in a separate Bulletin of the Department, [1] but a summary of the conclusions will be found below.

In March, 1951, a reconnaissance soil survey of the Scotland District was carried out by E. L. Birse and J. P. Watson of the Imperial College of Tropical Agriculture. They prepared slope category, soil type, present land use and provisional land capability maps of the 22-square mile area. In July, 1952, Birse returned to the Island to carry out a reconnaissance survey of the coralline limestone soils. His report suggested some slight modifications of the soil groups proposed by Saint in 1934.

A survey of the field experiments on the fertilizing of sugar cane carried out in Barbados since 1928 was made by G. E. Hodnett of Rothamsted Experimental Station Statistics Department under a Colonial Development and Welfare Scheme. The results of 44 experiments involving 65 crops were abstracted and examined and the mean responses to the major nutrients were tabulated for the two major soil types on the coralline limestone.

In the absence of an Agricultural Chemist, the routine laboratory work has been supervised by the Government Analyst.

Laboratory. The table below shows the number and type of samples received in the laboratory from April, 1954 to March, 1955.

Type of Sample	Source	Number
Milk	Monthly samples from the Central Livestock Station	501
Sugar Cane Leaf	Manurial Trial Investigations	313
Soils	Irrigation Research. Moisture only	317
Soils	Advisory and investigational	8
Water	Well waters	22
Miscellaneous	Advisory and investigational	50
	TOTAL	1,211

These samples represent approximately 2,500 individual determinations.

In January, an E.E.L. Flame Photometer was installed and new methods of analysis for sodium and potassium introduced. A method for the determination of calcium in plant materials using the instrument is being developed.

Milling Laboratory.

During the 1955 reaping season, seven hundred and forty-eight (748) cane bundles were received. Four hundred and fifty-six (456) were analysed for sucrose only and on the remaining two hundred and ninety-two (292) a complete analysis was performed. The sample bundles were mainly from the trials of the B.W.I. Central Sugar Cane Breeding Station.

1. 4 x 3 x 2 K.N.P. Trials:

These trials were laid down by Mr. J. B. D. Robinson in 1951 and continued for 3 years. Direct and cumulative effects of the three major nutrients were observed on plants and ratoons respectively. These showed a linear response to nitrogen up to 3 cwt. per acre sulphate of ammonia on the black soils (low rainfall) and 4 cwt. per acre on the red soils (high rainfall). There was a reduction in yield when the nitrogen was applied in Januray rather than at the normal time in June-July. There was only one significant response to potash at the three centres and this was in second ratoons at the red soil centre. There were no significant responses to phosphate fertilizers.

2. 3 x 3 x 3 Potash Trials:

These trials also were laid down by Robinson and the design is set out in the Annual Report 1951—52. As plants, there was one significant increase in yield to 1½ cwt. muriate of potash and a mean response of 1.33 tons cane per cwt. of muriate of potash over 4 trials up to 1½ cwt. per acre. As ratoons, significant residual effects appeared in two of the three sets of data available. These residual effects were of such a magnitude as to have affected the results of previous annual experiments considerably. They show how annual applications of potash could build up the soil reserves as found by Robinson [(2)] see line 6 para. 1 on opp. page, in a few years.

3. Leaf Samples:

Leaf samples were taken from all the above trials before and after the nitrogen application in July. The results show that some factor other than soil potash influences the potash content of the leaf samples and further work is necessary on this problem if leaf analysis is to be used as a basis for fertilizer recommendations. Phosphate levels in the leaves were adequate by standards used in Jamaica, British Guiana and Mauritius. The small number of nitrogen results were inconclusive but they did reflect the increase in yield from nitrogen manuring.

4. New Trials laid down in 1954:

(i) Three more 3 x 3 x 3 direct and residual potash trials. Two of these are on red sand soils known to be deficient in potash, the other is on a St. George Valley Clay.

(ii) Two small plot irrigation trials were laid down comparing 3 different rates of irrigation and 3 rates of nitrogen. Water is being applied by hand.

(iii) A trial to test the effect on yield of iron chelates applied to plant cane showing chlorotic symptoms in the early stages.

Irrigation.

In co-operation with the Agronomist, a scheme of irrigation has been drawn up and started. The problem was to determine—

(a) the effects of irrigation on growth and yield;

(b) when the water should be applied and in what quantity;

(c) any possible interactions with variety, manurial practices, planting and reaping dates, etc.

Information on (a) is being sought by means of the small plot irrigation trials, general comparisons between irrigated and unirrigated areas and growth measurements. These investigations may have to be modified in the light of experience gained during the 1955 season.

The previous Chemist used nylon block resistances in his approach to problem (b). These have been discarded for several reasons. The approach now being used is that developed by Penman using meteorological data or evaporation measurements to calculate the amount of water lost from a field. Comprehensive work on this method of irrigation control for cane is being done in Jamaica and some of their results have been used.

Preliminary results indicate that a modified spacing would probably result in increased yields under irrigation. The 5' x 5' spacing now used is much wider than in other parts of the world but it may be justified to overcome the 4—5-month dry season which occurs when the cane is 1—2 months old.

Animal Nutrition.

Feeding Trials:

In co-operation with the veterinary staff, a feeding trial was carried out at the Central Livestock station. Four fodders normally used in the dry season were compared using dairy cattle. Standard concentrate rations were fed to all groups of cows. The results showed that the values of the fodders could be predicted from the chemical analysis using published digestibility figures and that feeding standards used in temperate climates could be applied in Barbados. The table below gives a summary of the results. A detailed description of the experiment will be published in the Investigations Bulletin.

Fodder	Amount consumed	Concentrate	Total dry matter consumed	Yield
Fresh Cane Tops	70.7	6.05	32.6	16.76
Elephant Grass	99.3	6.08	22.2	18.29
Cane Tops	66.7	5.93	37.6	17.50
plus maize silage	30.0			
Cane Tops	68.7	6.17	35.5	17.13
plus Elephant grass silage ..	15.0			

All units are pounds per cow per day

The concentrate contained 26% crude protein.

References:

1. Record of Investigations (1954—55) Bulletin No. 23 (New Series) Department of Agriculture, Barbados.

2. Robinson, J. B. D. (1952) Journal Soil Science, Vol. 3, Page 182.

SECTION VII

AGRONOMY

By
W. H. C. KNOWLES
Agronomist

The post of Cultivation Officer fell vacant in April, 1953, and remained so until May 10th, 1954, when the writer assumed duty. Shortly afterwards the title of the post was changed to that of Agronomist and the duies of the post enlarged to include a wide range of agronomical problems.

It will be realised that, owing to the circumstances set out above, it has not been possible to report annually the results of trials, etc. Nevertheless, a fair amount of work has been undertaken and a number of trials reaped. Brief mention of the various trials and projects will be made in this report, but further details will be found in the Department's Bulletin — "Record of Investigations, 1954—1955," which is in preparation.

Sugar Cane Investigations:

A. Work in Progress in 1951—52

(1) *Improved Soil Management under the Cane-hole System*:

Of the three trials mentioned in the 1951—52 Annual Report, two were reaped as plants, first and second ratoons respectively, and one as plant and first ratoons only.

Results were inconclusive, but suggested on the whole that little benefit resulted from the more intensive forms of sub-soil cultivation. Differences in the siting of cane-holes exercised very small effects upon yields.

(2) *Management of Group IV Soils* :

The experiment described in the 1951—52 Annual Report has been reaped as plants and first ratoons. Significant differences between treatments were not obtained in either case.

(3) *Bagasse Application*:

The results of the two trials in which the effect of applying bagasse to the field was studied, suggested that it exercises a beneficial effect upon yield which appears to be independent of its effect as a mulch, and of the method by which it is applied. Further experiments are necessary and are being undertaken.

(4) *Weed Control*:

Little progress has been made in the field of chemical methods of weed control. A skirmish trial to test various commercial herbicides as pre-emergence weed control agents has been completed.

(5) *Changes in Productivity consequent on Improved Soil Management*:

These studies have been abandoned temporarily, but it is hoped to renew them when time and opportunity permit.

(6) *Soil Moisture Studies with Nylon Blocks*:

Partly as a result of experience in Barbados and partly because of developments elsewhere, it has been decided to discontinue, at least for a time, the use of Nylon Resistance Blocks as a means of assessing soil moisture.

The current approach to the problem has been outlined in the Agricultural Chemist's section of this Report.

B. Current Research:

(1) *Irrigation*:

Investigation of irrigation problems is being undertaken in co-operation with the Agricultural Chemist and the work is summarised in his section of this report.

An observation trial to test the effects of different reaping dates and irrigation practices on plant and ratoon canes was carried out. A field of canes in each category was selected and irrigation water applied at intervals during the crop season. Reaping was undertaken for both irrigated and unirrigated portions of the field at three dates (early crop, middle and late). Results suggested that irrigation had increased yield but there was no indication of progressive benefits over the crop season.

(2) *Residual Effects of Food Crops on Cane*:

A trial to test the effects of various types of food crops planted in preparation land on the subsequent cane crop has been established. Among the food crops being tested are—Yams (to be reaped early and late); Sweet Potatoes (early and late); Maize (fertilized and non-fertilized); and 'Rounceval' Peas.

(3) *Pen Manure Method of Application Trial*:

A trial to assess various methods of preparing and applying pen manure to cane has been established at the Pine Plantation.

Investigations On Other Crops:

Fodder Grass:

A trial to test the effects of sub-soil cultivation of permanent Elephant grass pastures has been completed. Cultivation at intervals of 6, 12 and 18 months all failed to effect any improvement in the yield of grass over a period of 2½ years.

Nursery plots of new species of fodder grasses including the very successful Pangola (*Digitaria procumbens*) have been established and observed.

Advisory and Extension:

Throughout the year advice on cultivation and soil conservation problems was given to both plantations and peasant proprietors and layouts involving the use of contour cultivation have been established. It must be confessed, however, that the number of requests for advice on these matters is small and, at the moment, the planting community generally appear content with the protection against erosion afforded by the cane-hole system and by the use of mulches.

A development which took place during the year was the substitution of the road tracer for the striding level in laying out key contours. The road tracer is to be preferred as it is equally accurate, permits of greater flexibility in the selection of check points, can give useful information in regard to levels and is very much more easily transported and manoeuvred in the field.

Pine Plantation:

Careful supervision of the agricultural operations at the Pine, with special reference to cultivation problems, was continued.

It has been realised that in the heavier soil types, particularly those under irrigation, drainage is a prime consideration and a concerted effort is being made to improve drainage in these areas, both by more intensive cultivation methods and by the digging of suck wells.

The attempt to measure the changes in the productivity, both of the estate as a whole and of the individual fields, is being continued on the lines set out in the 1951—52 Annual Report. Indications are that the Pine, as a whole, is improving, but so far there is nothing to indicate that this improvement is taking place at a rate greater than that which is occurring on plantations generally. Special conditions — *e.g.* the necessity for producing large amounts of fodder throughout the year — handicap the Pine in so far as cane production is concerned, but it is to be hoped that more progress will be made in the coming year.

SECTION VIII.

ENTOMOLOGY

By
R. W. E. TUCKER
Entomologist

The principal Entomological problems during the period 1954-55 were the control of the cane root mealy bug *Neorhizoecus* n.sp. and its associated ant *Acropyga marshalli* and an attempt to control by soil chemicals the new resurgent cane root pest *Diaprepes abbreviatus* or cane root borer.

The small moth borer of sugar cane *Diatraea saccharalis* and termites damaging wooden structures have been kept under control; but lack of staff has prevented any investigations this year into damage caused by termites in sugar cane fields.

Inspections of incoming and outgoing planting material have fallen this year on the Entomological Staff.

The Bostrychid beetle *Sinoxylon conigerum* Gorst., which was intercepted several years ago in wood coming direct from India, was found in numbers and breeding in cord wood on an inter-island schooner.

Small Moth borer of sugar cane (Diatraea saccharalis)

During the year under review, a total of 356,744,000 *Trichogramma minutum* for the control of the above pest was bred in the laboratory and of these a total of 312,151,000 was available for field distribution after maintaining the necessary proportion for the maintenance of the annual breeding cycle.

Owing to precedence taken by other work, it was possible to make restricted counts of bored canes at 10 factories only instead of at 12 and the average for these counts was 10.4 per cent cane internodes bored.

Higher figures than usual were obtained at factories receiving cane from areas treated with B.H.C. or Aldrin; there is some confirmation for this in individual field counts but whether such increases in infestation are directly attributable to the use of chlorinated hydrocarbons in cane fields is not yet known.

Considerable numbers of *Sitotroga* eggs and of such eggs parasitised by *Trichogramma minutum* were sent to other countries which have started mass breeding *Trichogramma* as a control measure against *Diatraea* in sugar cane.

Root Borer (Diaprepes abbreviatus) and Brown Hard Back (Clemora smithi)

Large scale field experiments in which halves of fields were treated with 13 lb. gamma isomer as B.T.C. in 750 lb. of ground coral stone per acre were laid down in known root borer areas when fields were being prepared for planting cane in 1953.

Early in 1954 (May) it was found that some of the half fields so treated were being so severely damaged by root borer grubs that the young canes had to be dug up. The untreated halves had so much less root borer attack that they were left to continue growing. Attack by root borer is unpredictable,

but reports received indicate that it is growing in intensity again, after being brought under control by organised and co-operative hand picking from 1929 to 1939. This trend of preferential attack against land into which 13 lb. gamma isoner has been incorporated cannot be ignored and unless hand-picking can be revived, different chemicals such as Malathion, or different methods or rates of application of B.H.C. must be investigated.

Brown hard back (*Clemora smithi*) still appears to be under control by the imported predator (*Pyrophorus luminosus*) but to the time of writing in May, 1956, continuous dry weather amounting to drought has retarded emergences of both pest and predator.

Cane Root mealy bug Neorhizoecus n.sp.

Preliminary indications are that reasonable control of this pest and of its associated ant *Acropyga marshalli* can be obtained by the use of 13 lb. gamma isomer as B.H.C. in 750 lb. powdered coral limestone ploughed and harrowed into the soil at cane land preparation time and by broadcasting it on to the soil of infested ratoon fields. Ploughing out of infested ratoon fields and reduction in number of ratoon fields has also helped. Control by the first method is not easy to prove as the tillage operations in properly prepared fields destroy the majority of the mealy bugs and ants in the soil, and the first or plant cane crop reaped does not therefore show any attack and it is too early yet to say when if at all, the mealy bugs and ants will regain lost ground. Further, canes in such gammexane treated soil tend to give a greater proportion of rotten cane when reaped, partly due to moth borer attack and partly due to early stimulation of growth, possibly due to removal of minor root damaging pests and possibly to some unknown factors.

The average for most treated preparation fields is an increase in first crop tonnage of around 2 tons per acre. Control of the root mealy bug and ants in infested ratoon fields is shown by the results of blocks of randomised plots treated as ratoons in 1954 and reaped in 1955. Where conditions of infestation, soil texture, times of application and rainfall to carry the insecticide into the galleries of the ants were all suitable, highly significant (above 1 per cent level) results were obtained.

The results of these scientifically laid out blocks of randomised plots have been confirmed in treated ratoon fields. Where control has been effected in infested ratoon fields tonnage increases have ranged from 6 to 14 tons per acre.

Further experimentation is needed to confirm these results, and to test new chemicals such as Malathion and Diazinon. So far, extremely dry weather conditions have precluded the laying out of more experiments as surface applications to ratoons fields are useless unless rain falls to carry the insecticide into the soil. Fields suitable to such experiments have been marked out, and the 1954 experiments will be repeated when the rainy season does start.

General Entomology

Work on plant pest inspections, advice on and practical assistance in spraying; fumigation of bags for export, termite inspections and treatments of buildings have been continued as in other years. A Bostrychid wood boring beetle, *Sinoxylon conigerum* was intercepted in cord wood reaching the Island.

SECTION IX

PLANT DISEASES

By

J. E. CLARKE,
Agricultural Assistant.

Plant Pest and Disease (Importation) Act.

Twenty (20) permits to import planting material were issued under this Act.

Plant Export Certificates.

One hundred and ninety (190) export certificates were issued during the year.

Miscellaneous Inspections of Imported Planting Material.

168	packages of bulbs, vegetable and flower garden seeds and Rose trees	—	examined and passed
7,313	Coconut plants	—	,, ,,
9	Mango plants	—	,, ,,
27	Orchid plants	—	,, ,,
33	packages Orchid plants	—	,, ,,
850	Rose trees	—	,, ,,
29	packages Rose trees	—	,, ,,
2	Citrus plants	—	,, ,,
18	packages Bulbs	—	,, ,,
3	packages Anthurium Lily plants	—	,, ,,
4	Banana Suckers	—	,, ,,
8	Hibiscus plants	—	,, ,,
1	package Strawberry plants	—	,, ,,
48	Ornamental plants	—	,, ,,
33	bundles Christmas trees	—	,, ,,
1	package Miscellaneous plants	—	,, ,,
1	package Tubers	—	,, ,,
6	packages Tree Fern	—	,, ,,
3	Coconut plants	—	Destroyed

In addition to the above, 90 bales of cotton lint imported from overseas were inspected. Six (6) shipments of broken rice were also inspected.

SECTION X

ANIMAL HUSBANDRY

By

M. B. PROVERBS,

Senior Veterinary Officer

1. Cattle:

The cattle breeding programme was expanded during the year and artificial insemination only was employed. All stud bulls were maintained at the Central Livestock Station and semen was delivered to the District Agricultural Stations three times a week. Visits were also made from the Central Livestock Station to artificially inseminate cattle, and in February 1955, an additional Assistant Livestock Officer was appointed to carry out this work.

The two pure bred Friesian and the two pure bred Guernsey bulls imported from Britain in 1953, were used during the year, in addition to one pure bred Jersey and five grade Friesian and five grade Guernsey bulls. The fertility of cattle artificially inseminated was considered to be better than that of animals which had received natural service in previous years.

Numbers of cattle inseminated during the year and corresponding figures for the previous year are as follows:—

Year	Central Livestock Station	Groves	The Home	Jerusalem	Sayes Court	Haggatts	Bullen	Total
1952—53 ...	410	310	204	196	52	24	—	1,196
1953—54 ...	1,173	126	126	116	70	79	51	1,741
1954—55 ...	1,392	568	170	131	66	87	78	2,492

Cattle Breeding at the Central Livestock Station:

The cattle breeding policy for the Central Livestock Station, namely, the upgrading of local cattle by breeding to imported pure bred sires of selected European breeds, viz., Friesian and Guernsey, was continued during the period under review. Careful observations were made during the year on the comparative milk production, heat tolerance, growth rate, size at maturity, fertility and longevity of the higher grades as compared with the original foundation stock. No definite opinion could be formed by the end of the period under review, but the indications were that some animals were too highly graded, with the result that a loss of heat tolerance was interfering with their ability to produce the quantity of milk that they would otherwise have been capable of producing. This condition was particularly evident in the highly graded animals of both breeds shortly after calving, that is, when they were subjected to the maximum stress.

By the end of the year the size of the herd had attained 97 cattle units of which 46 cows were in milk. The total quantity of milk produced was 287,397 lb. as compared with 220,052 lb. in the previous year.

2. Sheep:

The comparison between the local Black Belly sheep and the progeny of the cross between the imported Wiltshire Horn sheep and the local Black Belly was continued during the year. Weight gains of lambs are being recorded each month for 12 months, and the regularity of breeding and number of lambs born to the ewes of each breed are being noted.

The demand for export of good quality Black Belly sheep, particularly rams, increased during the year and thirty-one animals were exported, compared with twenty-one in the previous year.

The monthly weight gains for six pure bred Black Belly sheep, four pure bred Wiltshire Horn sheep and one Wiltshire Horn x Black Belly (First Cross) are shown in the Appendix.

3. Pigs:

The Central Livestock Station and District Agricultural Stations maintained a breeding unit of approximately 50 sows and 14 boars during the year, composed mainly of the Large Black breed. Four Large White gilts and one Large White boar, progeny of one of the Large White sows imported in 1953, were reared at the Central Livestock Station. Their progeny will be distributed to the District Agricultural Stations during 1955 and surplus animals will be available for sale to the general public.

Efforts to satisfy the increased demand for young pigs for rearing were not being nearly fulfilled and it was consequently decided to subsidise the breeding of pigs. This scheme, which came into operation in October 1954, provided a free issue of 100 to 200 pounds of feed for each litter of pigs after inspection shortly after birth. The scheme was generally popular, and would appear to be having the desirable effects of stimulating an interest in pig breeding and producing more thrifty piglets by supplying them with larger quantities of a suitable ration at an early age.

4. Goats:

Pure bred British Alpine and Saanen bucks and does are being maintained at the Central Livestock Station. Bucks of both breeds are also maintained at the six District Agricultural Stations for stud purposes.

5. Poultry:

The poultry section was expanded during the year to meet the increased demand for week-old chicks. Hatchability improved considerably with the use of the new 2112 model Hearson Incubator and during the year 7,648 chicks were sold as compared with 2,434 chicks in the previous year. The distribution of chicks was delayed until they were two weeks old and had been vaccinated against fowl pox. Two breeds of poultry are being maintained at the Central Livestock Station, White Leghorn and Parmenter Reds. The Parmenter Reds are rapidly increasing in popularity as a dual purpose breed.

COMPARISON OF GROWTH RATES OF WILTSHIRE HORN AND BLACK BELLY SHEEP

Weights of Pure Bred Black Belly Sheep

	Birth	1st Month	2nd Month	3rd Month	4th Month	5th Month	6th Month	7th Month	8th Month	9th Month	10th Month	11th Month	12th Month	Sex
1	7½	18	31	51	56½	64½	75	81½	90	98	108	118	133	Male
2	8	18¼	33	52	60	68	78	82	88	94	102	112	125	Male
3	10	26	40	60	81½	93	105	115	128	138	146	155	135	Male
4	9½	23	33	51	60	72	80	91	95	96	94	92	93	Female
5	8½	20	31	44½	60	72	83	95	96	98	98	99	100	Female
6	8	20	31½	44½	55	64	75½	87	84	92½	92	94	95	Male
Total	51½	125½	199½	303	373	433½	496½	551½	581	616½	640	670	681	
Average ...	8½	20½	33	50½	62	72	82½	91½	96½	102⅓	106½	111½	113½	

Weights of Pure Bred Wiltshire Horn Sheep

1	8½	21	28	47	55	66	78	86	101	100	105½	113	108	Female
2	9½	20	26	40	49	59½	70	78	79½	82	85	90	94	Female
3	10	24	32	43	55	64	75	98	107	119	134	138	140	Male
4	11	25	35	48	60	65	70	94	104	115	128	132⅓	136	Male
Total	39	90	121	178	219	254½	293	356	391½	416	452⅓	473½	478	
Average ...	9¾	22½	30¼	44½	54¾	63½	73¼	89	97⅝	104	113	118¾	119½	

Weights of Half Bred Wiltshire Horn Sheep (Wiltshire Horn x Black Belly)

1	9½	27	38½	61	88	112	130	141	150	158	165½	170	177	Male

SECTION XI.

ANIMAL HEALTH

By

M. B. PROVERBS

Senior Veterinary Officer

Review of Diseases:

During the year there were no fresh outbreaks of animal or poultry diseases in the Island, and the general health of Government-owned livestock was maintained at a satisfactory level.

Investigations into the more important animal and poultry diseases occurring in the Island were continued and attention was particularly focussed on the various conditions associated with infertility in dairy cattle.

1. Mastitis in Dairy Cows:

The incidence of mastitis in dairy cows was slightly less than in the previous year, particularly during the dry period and immediately after calving. Acute sporadic cases continued to occur but early treatment with aureomycin was generally effective and considerably reduced the degree of permanent damage to affected quarters. An effort was made to reduce the incidence of these sporadic cases by the removal of chronic carriers from the herd and by improvements in dairy hygiene and milking technique.

2. Sterility in Dairy Cows:

Investigations into the high incidence of sterility in dairy cattle throughout the Island was continued. The conception rate improved only slightly during the first half of the year and was not considered to be as good as it should have been after the removal and slaughter of all bulls found to be infected with Trichomoniasis and the treatment of infected cows. It was subsequently discovered that the mineral content of the concentrate feed had been materially altered and after reverting to the original mineral mixture a marked improvement in fertility was noted. Comparisons for the last three years of cattle inseminated at the Central Livestock Station are shown in Table I.

TABLE I.

	1952—53	1953—54	1954—55
Number of cows conceiving after one insemination	5 out of 33	6 out of 26	14 out of 45
Number of heifers conceiving after one insemination	5 out of 7	6 out of 11	4 out of 8
Combined conception rate for cows and heifers based on first service	25%	32.4%	34%
Average number of inseminations required to get each animal in calf	4.5	3.8	3
Number of sterile cows sold for slaughter	5	2	5

3. Trichomoniasis:

One bull only was found to be infected with Trichomoniasis during the period under review. This bull was privately owned, and was subsequently slaughtered. The incidence of this disease has therefore been considerably reduced in cattle, since the establishment of artificial insemination.

4. Johne's Disease:

There were three cases of Johne's Disease during the year and these animals were slaughtered. The incidence was not as high as the previous year, when seven cases were recorded.

5. Tuberculosis:

The routine annual test on all Government-owned cattle again revealed that there was no evidence of infection of bovine tuberculosis and all animals passed the test. The incidence of the disease in animals throughout the Island is now very small and only rarely is the disease found in the slaughter-house.

6. Poultry Diseases:

There was no serious outbreak of poultry disease in the Island during the year. There was a suspected outbreak of Newcastle Disease in one flock of broiler chicks about two months old which had been imported from Trinidad. These chicks were slaughtered, the premises disinfected and the disease has not reappeared.

All chicks sold from the Central Livestock Station are vaccinated against Fowl Pox and this disease appears to be less prevalent throughout the Island.

7. Importations of Meat and Meat Products:

Permits for the importation of all meat and meat products from certain scheduled countries only, were issued during the year. As a result of continued outbreaks of Vesicular Exanthema among swine in the United States of America as well as a high incidence of Swine Fever, imports of uncooked pork and pork products were not permitted to be imported from that country.

8. Importation and Exportation of Animals:

The strict control over the importation of animals and animal products was maintained during the year. These controls are enforced in an effort to prevent the introduction of disease, and results have been entirely satisfactory.

Tables II and III indicate the numbers and types of animals, including poultry, inspected prior to export and on arrival in the Island, and comparisons are given for the two previous years.

Table II

VETERINARY INSPECTION OF ANIMALS PRIOR TO EXPORT

Year	Horses	Cattle	Goats	Sheep	Pigs	Dogs	Cats	Rabbits	Poultry
1952—53 ...	77	6	40	30	6	67	7	32	12
1953—54 ...	90	7	28	21	3	49	1	—	—
1954—55 ...	111	2	17	31	12	38	5	7	250

Table III

VETERINARY INSPECTION ON ARRIVAL OF IMPORTED ANIMALS

Year	Horses	Cattle	Goats	Sheep	Pigs	Asses	Mules	Dogs	Cats
1952—53 ...	83	1	—	—	7	3	1	15	4
1953—54 ...	117	7	4	1	9	22	23	22	3
1954—55 ...	92	2	2	—	5	1	5	17	3

SECTION XII.

FISHERIES

By

D. W. WILES,

Fishery Officer

The work of the Fisheries Division for the period under review is dealt with under the following headings:—

A. Loans.
B. Research Work.
C. Conferences.
D. Markets & Marketing.
E. Cold Storage.
F. Salting of Flying Fish.
G. Fishing Boat Insurance.
H. Fishing Industry Act.
I. Mechanisation of Fishing Fleet.

A. Loans.

During the financial year 1954—55, loans were granted under the provisions of the Fishing Industry Act amounting to $10,025.77 for the repairing and refitting of some thirty-five (35) boats and the assisting with the building of six new sail-type boats. A further amount of $22,670.00 was granted to purchase and install fourteen (14) marine engines into launch type hulls.

The financial position of all funds operated by Fisheries Division at 31st March, 1955, was as follows:—

	Amt. actually expended	*Amt. repaid*	*Balance*
	$	$	$
Redemption of Loans	77,788.69	65,025.38	12,763.31
Revolving Fund	104,035.49	41,893.79	62,141.70
Emergency Fund	58,904.76	2,875.48	56,029.28

B. Research Work:

"Investigator" was used during the year in a number of ways, some of which must be considered as preliminary investigations for other plans for the next fishing season.

Between April and July, work was continued on flying fish operations and experiments with the flying fish ring net were carried out. As a result of these further trials, it was decided to build up a net with smaller meshes of 1½" stretched mesh, as the net used in these experiments was 1⅞" and had proved the efficiency of the operation, but as 80% of more fish became gilled in a haul of a thousand or more fish, much time was required to remove these fish from the net between each haul.

The indications from these preliminary trials were that the nylon net was more efficient than cotton net.

The use of gill netting of the wrong colour by fishermen has been one of the reasons why fewer fish were taken in the early part of the 1954—55 fishing season. One of these off-colour nets was tried out from "Investigator" and after four days of operation had only taken twenty (20) fish, while the correct type of cotton gill net fishing alongside had taken many hundreds of flying fish.

It is encouraging to record that the trade is now requiring the agent to produce a certificate from the Fisheries Division before they produce new stocks of gill netting.

Experiments with weighted trolling lines were carried out during October —January 1955, on the king fish fishery with encouraging results. These methods have been passed on to fishermen exploring this fishery and the manner of arranging weights on to their lines has been explained to many. Little work was done between January 15 and March 31, 1955.

Trials with a gill net for bonita were also carried out. This net was extended, altered and made ready for the next season. Exploratory deep sea trials and depth recordings were also carried out on the banks north of the Island.

C. Conferences:

In November 1954, the Fishery Officer attended the seventh session of the Gulf and Caribbean Fisheries Institute, which was held at the Nacional Hotel, Havana, Cuba. Many important papers were presented by fishery workers and much useful information was collected. A full report of this meeting has been submitted to Government.

The development of new fishery techniques seen on motion picture and discussed at this conference is being worked on and should go into the trial programme for the 1955—56 fishing season.

At this session, the Fishery Officer presented a short paper on "Insurance of Small Boats in the Barbados Fishery." The insurance of fishing boats stimulated much discussion and methods of approaching this important problem of protection were considered. Towards the closing of this session, the Fishery Officer of Barbados was enrolled a member of the Executive Committee of the Gulf and Caribbean Fisheries Institute.

D. Markets and Marketing.

Bridgetown Fish Market.

Returns through the Bridgetown Fish Market show an increase of 51,481 lb. of fresh fish over the previous year. There were also 371 more boat landings recorded than in the previous year. This may be some indication that fishermen and boat-owners are beginning to use the Market to a greater extent.

Returns of fish marketed through the Bridgetown Fish Market up to 6.00 p.m. for the last two years are as follows:—

Month	1953—54		1954—55	
	Landings	lb.	Landings	lb.
April	586	141,635	282	56,990
May	246	68,114	500	122,788
June	113	26,478	220	47,093
July	6	960	40	18,769
August	4	2,323	1	2,131
September	—	—	1	3,267
October	4	1,554	4	2,934
November	42	4,878	24	6,635
December	78	12,871	269	33,834
January	155	19,407	193	25,123
February	209	34,851	198	31,985
March	244	46,237	326	59,240
	1,687	359,308	2,058	410,789

Average catch per boat landing is 199.31 lb.

Speightstown Fish Market

This Market recorded its first full year of operation during 1954-55 financial year, having commenced operations in January of 1954. For the year under review, returns at this Market exceeded those of the Bridgetown Market by 54,728 lb. It should also be noted that 1,719 more boat landings were recorded at this Market.

Returns of fish marketed through this Market up to 6.00 p.m. are as follows:—

Month	1953—54		1954—55	
	Landings	lb.	Landings	lb.
April	—	—	512	76,908
May	—	—	872	155,099
June	—	—	420	53 329
July	—	—	276	28,434
August	—	—	37	2,581
September	—	—	25	356
October	—	—	20	402
November	—	—	67	2,396
December	—	—	239	20,174
January 14th	158	8,173	221	21,296
February	451	49,672	447	61 859
March	508	51,553	341	42,683
	1,117	109,398	3 477	465,517

The average boat landing is, however, less than the Bridgetown landings, the amount being 133.8 lb. per boat.

Oistins Fish Market

The following is the amount of fish landed through this market up to 6.00 p.m.:—

Month	1953—54 Landings	1953—54 lb.	1954—55 Landings	1954—55 lb.
April	95	14,891	47	6,645
May	56	4,587	170	33,614
June	38	3,245	65	9,509
July	25	1 604	44	3,178
August	29	2,609	68	6,166
September	20	1,189	53	3,090
October	20	1,299	64	3,177
November	24	1,780	53	3,457
December	48	3,715	55	4,417
January	42	4,679	47	4,591
February	63	7,884	76	9,649
March	43	7,405	85	9,967
	503	54,887	827	87,460

The average catch per boat landing for year under review is 105.7 lb. This is still less than the average for the Speightstown Market.

Beach Shelters:

The number of landings recorded at beach shelters is not known and only average landings are taken. However, this information will eventually be of considerable value to the industry and the average catch at five shelters are recorded.

Month 1953—54	Consett's Bay	Payne's Bay	Reid's Bay	Skeete's Bay	Martin's Bay
April	16,400	11,377	8,733	49,257	22,059
May	10,400	11,830	10,683	15,000	18,394
June	5,800	7,377	5,831	10,935	9,281
July	1,554	2,026	1,963	1,145	1,200
August	650	2,916	1,233	655	2,413
September	450	581	734	—	—
October	52	99	110	1,408	587
November	730	1,383	425	371	212
December	110	4,756	1,600	207	1,954
January	1,366	1,131	900	2,804	3,866
February	3,400	5,381	4,100	8,114	5,071
March	3,950	9,361	3,217	13,817	9,461
Total (lb.)	44,862	58,218	39,529	103,713	74,498

Month 1954-55	Consett's Bay	Payne's Bay	Reid's Bay	Skeete's Bay	Martin's Bay
April	4,250	22,620	7,000	11,108	5,000
May	8,000	11,830	13,681	31,560	23,187
June	5,650	11,191	5,673	5,211	25,941
July	3,000	11,915	2,712	3,821	8,650
August	360	214	500	—	400
September	—	—	—	1,740	—
October	26	—	—	—	—
November	750	3,235	1,150	3,647	900
December	1,422	3,700	3,000	3,200	771
January	71	4,183	1,652	391	—
February	2,700	4,981	2,900	3,100	3,315
March	2,000	12,188	3,720	8,542	4,214
TOTAL (Lb.) ..	28,229	86,257	41,988	72,320	72,378

By a careful study of these statistics, it is possible to trace the migration of the fish, especially if additional reference is made to the species recorded.

E. Cold Storage:

Cold storage experiments continued at the Reef Station on flying fish, king fish, dolphin and bream at temperatures of 0°F. to 5°F. All of these experiments were encouraging and successful. Fish were held in storage under various conditions from three days to three months. Much experience has been gained.

As a result of these experiments, much valuable information supplied by Fisheries Division was incorporated into a memorandum on the Fishing Industry by Mr. W. V. Rose, Deputy Director of Agriculture. This memorandum was prepared with a view of promoting a Government cold storage plant for fish.

Following on such a presentation, Government invited to Barbados a cold storage engineer to advise on this matter. Mr. James MacKenzie of the North British Cold Storage Company of Leith, Edinburgh, visited Barbados in this regard and submitted his plans and report to Government. Final settlement is awaited, as the site for such a plant is closely linked with plans for the Deep Water Harbour Scheme.

F. Salting of Flying Fish:

Early in the 1954-55 flying fish season, two trials were carried out with respect to the salting of flying fish. One lot of fish was gutted and salted in a round state, while the other lot was gutted, slit on the back-bone and flattened.

Both of these trials preserved the fish, but so reduced their economic value, as a marketable product in Barbados, that it is doubtful if private enterprise could be encouraged to produce such low grade salted fish. To encourage such a product would do little for the Industry, as the buyer of fish for such a product could only purchase when the market is in a very depressed state, and himself would be endeavouring to depress the market.

G. Fishing Boat Insurance:

This item continues to cause much concern in many fisheries of the world and Barbados is no exception. Insurance rates on sail-type boats continue to be high at 12 per cent and 15 per cent for ten (10) and twelve (12) months respectively.

With the introduction of competition into the marine insurance field for powered boats, this rate has been reduced to 4½% from 7½% for coverage for an entire year, against total loss or total construction loss.

Plans for the development of a Government operated Fishing Boat Insurance Scheme were submitted to the Honourable Minister of Agriculture, Lands and Fisheries. Interest in this Scheme has been aroused and further investigations are being made.

H. Fishing Industry Act and Regulations:

On 25th November, 1954, the Regulations under the Fishing Industry Act, 1952, were amended in order that loans may be extended to persons to assist with the cost of marine engines to be installed into hulls that had been constructed by boat-owners.

Under the Regulations of the Fishing Industry Act, it is now possible to obtain a loan (after approval has been given to hull construction) up to $2,160.00, provided always that the owner has first contributed not less than 40% of the total investment. Such a loan is repayable over a six-year period. Loans over $500.00, but under $2,000.00 are now repayable over a five-year period. Loans are in the main extended to persons on the security of the boat and engine covered by a marine insurance policy (assigned to the Governor-in-Executive Committee) for a value of four-fifths of the total valuation of the whole investment.

I. Mechanisation:

A scheme to advance loans for mechanisation was presented to the Honourable Minister of Agriculture, Lands and Fisheries shortly after the Fishery Officer had returned from the World Fishing Boat Conference held in Miami during November of 1953. This scheme was favourably received and the Regulations under the Fishing Industry Act, 1952, were amended to advance loans on a wider basis.

The Legislature passed a sum of $10,000.00 to supplement the Fisheries Revolving Fund in November of 1954, and along with $8,000.00 already in hand for mechanisation, a start was made on the introduction of larger loans for mechanisation of a number of boats. Applications for mechanisation exceeded this grant before the end of the financial year; however, this sum of $18,000.00 covered eleven (11) loans amounting to $17,835.00. All of these boats were built and launched by the end of April, 1955.

Mechanisation of the fishing fleet of Barbados is the most important development in our fisheries for this year, and given better boats, it is expected that our fishermen will return better catches to the Island. Private enterprise has also realised the value of mechanisation, and between October of 1954 and 31st March, 1955, there has been an increase of eighteen (18) of these launch-type powered fishing craft (all built and financed by private enterprise).

With the addition of these eighteen boats financed by private enterprise and eleven others financed by Government loans, the inboard mechanised fishing fleet now totals forty-four (44), of which thirty-nine (39) are powered with diesel motors, three (3) with petrol engines and two (2) with kerosene engines.

The collective value of these boats is in the vicinity of $141,700.00 The majority of these small powered boats are fitted with 10—18 b.h.p. diesel motors at a price ranging from $1,600.00 to $2,750.00 for the engine alone.

Considerable attention was given to the initiation of the scheme for the mechanisaion of the fishing fleet. In almost every case, the Fishery Officer was consulted on matters of hull design, engine bed installation and other matters affecting the fitting of an engine into a boat. After the installation of an engine, the Fishery Officer inspects, and where necessary, adjusts the alignment. Crews have been instructed in general maintenance and in the operation of an engine.

Developments within the fishing industry, together with the work involved in supplying statistical information, have placed additional pressure on the Fishery Officer and the two clerks of this Division. Every effort had been made to keep abreast of these developments and requests as they came to hand during the year under review.

PART IV.

FINANCIAL STATEMENT

Expenditure and Revenue for the Financial Year 1954—55

EXPENDITURE

Capital

Motor Tractors—Peasants	$ 8,811.09
Pig Breeding—Departmental Scheme	736.36
Fisheries Development	3,810.09
Livestock Insemination	2,709.20
Agricultural Development	47,315.51
Central Livestock and District Stations	16,472.95
Speightstown Fish Market	992.84
Control of Mealy Bug	2,858.73
Rehabilitation of Fishing Industry	10,000.00
	$ 93,706.77

Recurrent

1.	Personal Emoluments	$148,981.96
2.	Cost of Living Allowance	13,173.87
3.	Travelling Allowances	23,358.13
4.	Exhibition Expenses	1,699.75
5.	Contingencies	1,139.53
6.	Stationery and Library	3,056.13
7.	Control of Pests	1,402.66
8.	Seed Store	12,901.09
9.	Experimental Stations	45,925.36
10.	Botanic Station	5,999.56
11.	Upkeep of Government Laboratory	4,661.88
12.	Entomological	15,298.19
13.	Upkeep of Government Lands	971.69
14.	Pine Plantation and Central Livestock Station	148,809.93
15.	District Agricultural Stations	57,533.94
16.	Fisheries	15,633.30
17.	Veterinary	863.42
18.	Co-operative Section	709.42
19.	Pig Breeding Subsidy	32,639.94
20.	Water, Gas & Electricity	2,192.74
		$537.002.49

FINANCIAL STATEMENT (Concluded)

Non-Recurrent

1.	Equipment for Veterinary Laboratory	$ 1,168.00
2.	Equipment for Chemical Laboratory	2,987.46
3.	Furniture and Equipment	805.74
4.	Agricultural Development Scheme	4,869.06
5.	Water Heater	117.78
6.	Yards	599.95
7.	Steam Boiler	395.00
8.	Safety Precaution on Machinery	487.00
9.	Fire Extinguishers	162.60
10.	Cane Carts	3,590.31
11.	Visit of Expert on Soil Conservation	86.00
12.	Control of Sugar Cane Root Mealy Bug	3,046.20
		$ 18,315.10

REVENUE

Codrington Experiment Station—Field Produce	$ 9,830.94
Botanic Station :	
Ornamental & Useful Plants	934.89
Deposits on plant pots	1,863.76
Vegetable Seed & Insecticides	17,904.02
Chemical:	
Analyses of Miscellaneous Samples	124.56
Entomological:	
Fumigation of Bags for export	31.20
Sale of old wheat	227.00
Inspection of private buildings for Wood Ants	268.80
Pine Plantation & Central Livestock Station	113,131.57
District Agricultural Stations	25,632.95
Co-operatives—Fees, etc.	29.35
Fisheries	848.04
	$170,827.08

PART V.

AGRICULTURAL LEGISLATION

The Sugar Industry (Rehabilitation Price Stabilization and Labour Welfare) (Local Consumption) Act 1952 (1952—11)

This Act amends Section two of the Sugar Industry (Rehabilitation, Price Stabilization & Labour Welfare) (Local Consumption) Act, 1952, in order that the provisions contained therein may apply to the year 1954.

PART VI

LIST OF PUBLICATIONS ISSUED BY THE DEPARTMENT OF SCIENCE AND AGRICULTURE AND B.W.I. CENTRAL SUGAR CANE BREEDING STATION FROM 1925 TO DATE

Department of Science and Agriculture

Reports:

Report on the Sugar Cane Experiments for the Season between 1923—25, by J. P. D'Albuquerque, M.A., F.I.C., F.C.S.

Report on the Sugar Cane Experiments for the Season between 1924—26, by J. P. D'Albuquerque, M.A., F.I.C., F.C.S.

Report on the Department of Agriculture, Barbados, 1925—26.

Annual Report of the Department of Agriculture, 1926—27.

Report of the Department of Agriculture, Barbados, 1927—28.

Annual Report of the Department of Science and Agriculture, 1928—29.

Report of the Department of Science and Agriculture, Barbados, 1929—30.

Report of the Department of Science and Agriculture, Barbados, 1930—31.

Agricultural Journals:

Vol. 1 No. 1, Jan. 1932 (out of print)	An Investigation into the Evolution of Sugar Cane Varieties by Breeding in Barbados, 1887—1925, with a discussion on the application of the findings to the present day Scheme of Work, by A. E. S. McIntosh, B.Sc., Ph.D.
	A Survey of the Position of *Phytalus smithi*, Arrow, and its natural Enemies in Barbados, by R. W. E. Tucker, M.A., B.Ed.
	The Scientific Control of Pan Boiling, by S. J. Saint, M.Sc., Ph.D.
	The Status of *Trichogramma* as a control of *D. saccharalis* in Barbados, by R. W. E. Tucker, M.A, B.Ed.
	The Inversion of Sucrose in Syrup Manufacture, by C. A. Coppin, B.A.Sc.
	Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
	Memorandum on the Cotton Situation in Barbados.
Vol. 1 No. 2, April 1932.	Report on the work of the Department of Science and Agriculture for the year Ending June 30, 1932.
	Some Aspects of the Flora of Barbados (Cont'd.), by F. Hardy, M.A., F.G.S.
Vol. 1 No. 3, July 1932.	Report of the Geneticist for 1931—32.
	Some Aspects of the Flora of Barbados (Cont'd), by F. Hardy, M.A., F.G.S.
Vol. 1 No. 4, Oct. 1932.	A Discussion of the Results of Manurial Trials carried out on Sugar Cane in Barbados, 1928—32.

	Some Aspects of the Flora of Barbados (Cont'd), by F. Hardy, M.A., F.G.S.
Vol. 2 Nos. 1 & 2, April 1933.	Report on the Work of the Department of Science and Agriculture for the Year Ending June 30, 1933. Some Aspects of the Flora of Barbados (Concluded), by F. Hardy, M.A., F.G.S.
Vol. 2 No. 3, July 1933.	Report of the Geneticist for the Year 1932—33.
Vol. 2 No. 4, Oct. 1933.	Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D.
	Rate of Egg Deposition of *D. saccharalis* and Extent of Larval Mortality in Canefields and their relation to Control of *Diatraea* by *T. minutum*, by R. W. E. Tucker, M.A., B.Ed. Varietal Factors in Cane which may influence extent of Oviposition by *D. saccharalis* and a possible method for Determining Varietal Susceptibility to Borer attack, by R. W. E. Tucker, M.A., B.Ed.
Vol. 3 No. 1, Jan. 1934.	Sugar Cane Growth Measurements in Barbados, by A. E. S. McIntosh, B.Sc., Ph.D. A Contribution towards the Solution of the Problem of Control of the real mortality of *D. saccharalis* due to egg parasites, egg predators, natural larval mortality, larval parasitism and other factors, by R. W. E. Tucker, M.A., B.Ed.
Vol. 3 No. 2, April 1934.	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31, 1934.
Vol. 3 No. 3, July 1934.	The Coral Limestone Soils of Barbados, by S. J. Saint, M.Sc. Ph.D.
Vol. 3 No. 4, Oct. 1934. (Out of print)	Report of the Geneticist for the Year 1933—34. A Further Contribution to the Analysis of Field Data on *D. saccharalis* in Barbados, by R. W. E. Tucker, M.A., B.Ed.
Vol. 4 No. 1, Jan. 1935 (Out of print)	Manurial Trials with Sugar Cane. The Control of *D. saccharalis* in Sugar Cane in Barbados by frequent liberation of mass-reared *Trichogramma*, by R. W. E. Tucker, M.A., B.Ed.
Vol. 4 No. 2 April, 1935.	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31, 1935.
Vol. 4. No. 3. July, 1935.	Report of the Geneticist for the Year 1934—35.
Vol. 4 No. 4, Oct. 1935.	Manurial Trials with Sugar Cane.
	Sugar Cane. A Summary of Plantation Variety Yield Returns for Season 1933—35, by A. E. S. McIntosh, B.Sc., Ph.D. Juice Analyses in Relation to the Fertilizer Requirements of Barbados Soils, by S. J. Saint, M.Sc., Ph.D.
Vol. 5 No. 1, Jan. 1936.	Parasites Introduced into Barbados for Control of Insect Pests, by R. W. E. Tucker, M.A., B.Ed.
(Out of print)	Investigations into the Use of the Zeiss Hand Refractometer, by A. E. S. McIntosh, B.Sc., Ph.D., and G. C. Stevenson, B.A.
Vol. 5 No. 2, April, 1936.	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31, 1936.
Vol. 5 No. 3, July 1936	The Yield of Sugar Cane in Barbados in 1936. Report of the Botanist for the Year 1935—36.

Vol. 5 No. 4, Oct. 1936. (Out of print)	A Preliminary Investigation into Cane Varieties and Infestation by *D. saccharalis*, by R. W. E. Tucker, M.A., B.Ed.
Vol. 6 No. 1, Jan. 1937. (Out of print)	Manurial Trials with Sour Grass, by S. J. Saint, M.Sc., Ph.D. Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D. Sugar Cane Spacing Experiments, by G. C. Stevenson B.A.
Vol. 6 No. 2, April 1937. (Out of print)	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31, 1937.
Vol. 6 No. 3, July, 1937.	The Yield of Sugar Cane in Barbados, 1937. Report of the Botanist for the year 1936—37.
Vol. 6 No. 4, Oct. 1937. (Out of print)	The Control of Scarabee in Barbados, by R. W. E. Tucker, M.A., B.Ed. Larval Dispersion of *D. saccharalis*, by R. W. E. Tucker, M.A., B.Ed.
Vol. 7 No. 1, Jan. 1938.	Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D. An Account of an Experiment to Determine the Efficiency of two Weed-killing Sprays. Experiments with the Dwarf Banana. String Bean Variety Trial, Codrington, 1937. Experiments in the Use of Hortomone A to Stimulate Rooting and Establishment in Cuttings of Ornamental Plants.
Vol. 7 No. 2, April 1938. (Out of print)	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31, 1938.
Vol. 7 No. 3, July 1938	The Yield of Sugar Cane in Barbados in 1938. Report on Sugar Cane Breeding and Seedling Testing for the Year 1937—38, by A. E. S. McIntosh, B.Sc., Ph.D.
Vol. 7 No. 4, Oct. 1938. (Out of print)	Experiments in the Growing of Tomatoes and shipment to Canada. Co-operative Sugar Cane Spacing Experiments. Sweet Potato Storage Experiments.
Vol. 8 No. 1, Jan. 1939.	Manurial Trial with Sea Island Cotton, by S. J. Saint, M.Sc., Ph.D. Cotton Growing and Cotton Pests Control, by R. W. E. Tucker, M.A., B.Ed. The Control of *D. abbreviatus*, L. and L. (*Phytalus*) *smithi*, Arrow, in Barbados, surveyed over a period of eleven years, by R. W. E. Tucker, M.A., B.Ed.
Vol. 8 No. 2, April, 1939.	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31, 1939.
Vol. 8 No. 3, July 1939.	The Yield of Sugar Cane in Barbados in 1939. Report on Sugar Cane Breeding and Seedling Testing for the Year 1938—39, by A. E. S. McIntosh, B.Sc., Ph.D.
Vol. 8 No. 4, Oct. 1939.	Introduction, by R. W. E. Tucker, M.A., B.Ed., of Dry Area Race of *M. minense* into Barbados. The Termites of Barbados, by R. W. E. Tucker, M.A., B.Ed. *Bufo Marinus*, L. in Barbados, by R. W. E. Tucker, M.A., B.Ed.
Vol. 9 No. 1, Jan. 1940.	Manurial Trials with Sugar Cane, by C. B. Johnston, B.Sc.

Annual Report of the Department of Science and Agriculture for the Year 1940—41.

Annual Report of the Department of Science and Agriculture for the Year 1941—42. (Out of Print).

Annual Report of the Department of Science and Agriculture for the Year 1942—43. (Out of Print).

Annual Report of the Department of Science and Agriculture for the Year Ending 31st March, 1944.

Annual Report of the Department of Science and Agriculture for the Year 1944—45.

Annual Report of the Department of Science and Agriculture for the Year 1945—46.

Annual Report of the Department of Science and Agriculture for the Year 1946—47. (Out of Print).

Annual Report of the Department of Science and Agriculture for the Year 1947—48. (Out of Print).

Annual Report of the Department of Science and Agriculture for the Year 1948—49.

Annual Report of the Department of Science and Agriculture for the Year 1949—50.

Annual Report of the Department of Science and Agriculture for the Year 1950—51. (Out of Print).

Annual Report of the Department of Science and Agriculture for the Year 1951—52. (Out of Print).

Annual Report of the Department of Science and Agriculture for the Year 1952—53.

Annual Report of the Department of Science and Agriculture for the Year 1953—54.

Pamphlets (New Series):

No. 1, Jan. 1941.	Garden Pests of Local Importance.
No. 2, Jan. 1941.	Manuring of Crops.
No. 3.	The Identification and Treatment of the Common Diseases of the Chief Vegetable Crops.
No. 4.	Compost Making.
No. 5. (Out of print).	Rabbit Keeping in Barbados.
No. 6. Aug.	The Care and Maintenance of the Milch Goat in Barbados.
No. 7.	The Growing of Food Crops.
No. 8. (Out of print).	Hints to Cotton Growers.
No. 9, Oct. 1942.	The Selection and Storage of Seed Corn in Barbados.
No. 10, Oct. 1942.	(1) Possible Means for an Efficient Use of a Large Sweet Potato Crop. (2) War-time Rations for Livestock. (3) The Storage of Sweet Potatoes in Clamps.
No. 11, Nov. 1942.	Ways of Cooking Sweet Potatoes.
No. 12. (Out of print).	Recipes for the Use of Local Foodstuffs.
No. 13.	Recipes for the Use of Cassava Flour.
No. 14, Nov. 1945.	The Use of D.D.T. in Barbados.
No. 15, Oct. 1947.	Contour Farming.

No. 16, Dec. 1948. — Contour Cultivation in Barbados.

No. 17, July 1949. (Out of print). — Hints on the Growing of Citrus Trees.

No. 18, May 1950. — Soil Conditions and Sugar Cane Growth in Barbados.

No. 19, July 1951. — The Termites (Wood Ants) of Barbados.

No. 20, Jan. 1954. — Garden Pests of Local Importance.

Bulletins: (New Series):

No. 1, Jan. 1944. — Inventory of the Barbados Rocks and their Possible Utilization, by Alfred Senn, Ph.D.

No. 2, Aug. 1944. (Out of print). — The Culture of Garden Vegetables in Barbados, by D. M. Hanschell, B.Sc.

No. 3. — Notes on West Indian Hurricanes with Special Reference to Barbados, by C. C. Skeete, B.A.

No. 4, May 1945. — Manurial Trials with Food Crops, by F. H. B. Blackburn, B.Sc., A.R.I.C.

No. 5, Oct. 1945. — The Yield of Sugar Cane in Barbados in 1945, by C. B. Foster.

No. 6, Jan. 1946. — Sugar Cane and its Cultivation in Barbados, by C. B. Foster.

No. 7, July 1946. — Manurial Trials with Sugar Cane in Barbados by F. H. B. Blackburn, B.Sc., A.R.I.C.

No. 8, July 1946. — The Yield of Sugar Cane in Barbados in 1942, by C. B. Foster.

No. 9. — The Yield of Sugar Cane in Barbados in 1946, by C. B. Foster.

No. 10, Aug. 1947. — The Yield of Sugar Cane in Barbados in 1947, by C. B. Foster.

No. 11, Oct. 1947. (Out of print). — Peasant Agriculture in Barbados, by M. Halcrow, B.Sc., A.I.C.T.A., and J. M. Cave, D.I.C.T.A.

No. 12, July 1948. — The Yield of Sugar Cane in Barbados in 1948, by C. B. Foster.

No. 13, July 1949. — The Yield of Sugar Cane in Barbados in 1949, by C. B. Foster.

No. 14, Dec. 1949. — Manurial Trials with Sugar Cane in Barbados II, by J. B. D. Robinson, B.Sc.

No. 15, Aug. 1950. — The Yield of Sugar Cane in Barbados in 1950, by C. B. Foster.

No. 16, Dec. 1950. — Manurial Trials with Corn by J. B. D. Robinson, B.Sc.

No. 17, Nov. 1951.	Notes on Co-operation by J. M. Cave, D.I.C.T.A.
No. 17, Dec. 1951.	The Yield of Sugar Cane in Barbados in 1951, by C. B. Foster.
No. 18, Jan. 1952.	Manurial Trials with Sugar Cane in Barbados III, by J. B. D. Robinson, B.Sc.
No. 19, July 1952.	The Yield of Sugar Cane in Barbados in 1952, by C. B. Foster.
No. 20, Aug. 1953. (Out of print).	The Yield of Sugar Cane in Barbados in 1953, by C. B. Foster.
No. 21, Sept. 1954. (Out of print).	The Yield of Sugar Cane in Barbados in 1954, by C. B. Foster.

British West Indies Central Sugar Cane Breeding Station:

Reports:

Report on the British West Indies Central Sugar Cane Breeding Station for the Period Ending September 30, 1934.

Report for the Year Ending September 30, 1935.

Third Annual Report Ending September 30, 1936.

Fourth Annual Report Ending September 30, 1937.

Fifth Annual Report Ending September 30, 1938.

Sixth Annual Report Ending September 30, 1939.

Seventh Annual Report Ending September 30, 1940.

Eighth Annual Report Ending September 30, 1941.

Ninth Annual Report Ending September 30, 1942.

Tenth Annual Report Ending September 30, 1943.

Eleventh Annual Report Ending September 30, 1944.

Twelfth Annual Report Ending September 30, 1945.

Thirteenth Annual Report Ending September 30, 1946.

Fourteenth Annual Report Ending September 30, 1947.

Fifteenth Annual Report Ending September 30, 1948.

Sixteenth Annual Report Ending September 30, 1949.

Seventeenth Annual Report Ending September 30, 1950.

Eighteenth Annual Report Ending September 30, 1951.

Nineteenth Annual Report Ending September 30, 1952.

Twentieth Annual Report Ending September 30, 1953.

Twenty-first Annual Report Ending September 30, 1954.

Bulletins:

No. 1, Sept. 1933	Report on the Sugar Cane Breeding Problems of Antigua, Trinidad and St. Kitts, by A. E. S. McIntosh, B.Sc. Ph.D., Geneticist.
No. 2, June 1934.	Report on the Sugar Cane Variety Problems in St. Lucia derived from a visit during April, 1934, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 3, Sept. 1934 (Out of print)	Report on a Visit to Jamaica, June 1934, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 4, Nov. 1934 (Out of print)	Report on a Visit to Grenada, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 5, Feb. 1935 (Out of print)	Investigations into the Root Development of the Sugar Cane in Barbados. (i) Root Development in several Varieties under one Environment, by G. C. Stevenson, B.A., A.I.C.T.A., Assistant Botanist, and A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 6, June 1935.	An Account of the Policy and Methods Employed in the Breeding and Initial Stage of selecting Sugar Cane Seedlings, by A. E. S. McIntosh, B.Sc. Ph.D., Geneticist.
No. 7, July 1935.	Report on a Second Visit to Antigua, April 1935, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 8, Aug. 1935.	Gumming Disease Investigations in Barbados, by A. E. S. McIntosh, B.Sc. Ph.D., and G. C. Stevenson, B.A., A.I.C.T.A.
No. 9. Nov. 1935 (Out of print)	An Account of the Methods Employed in Testing and Selecting Sugar Cane Seedlings for Thick Cane Areas in the British West Indies, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 10, Aug. 1936.	The Yield of Sugar Cane in Barbados in 1936.
No. 11, Nov. 1936.	Investigations into the Root Development of the Sugar Cane in Barbados. (ii) Further Observations on Root Development in several Varieties under one Environment by G. C. Stevenson, B.A., A.I.C.T.A.
No. 12, April 1937.	Sugar Cane Fuzz Storage Experiments.
No. 13, June 1937	Report on a Second Visit to Grenada, April 1937, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 14, June 1937	A Botanical and Agricultural Description of Recently Produced Commercial Seedlings, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 15 July 1937	Report on a Visit to St. Kitts and Antigua, June 1937, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 16, July 1937	(i) Studies on Gumming Disease of Sugar Cane; (ii) Investigations into the Use of the Zeiss Hand Refractometer, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 17, Aug. 1937 (Out of print)	The Yield of Sugar Cane in Barbados in 1937.
No. 18, June 1938	Studies in the Use of the Zeiss Hand Refractometer. (ii) The Zeiss Hand Refractometer as an Indicator of Ripening in Sugar Cane, by A. E. S. McIntosh and G. C. Stevenson, B.A., A.I.C.T.A.
No. 19, Nov. 1938	Report on a Second Visit to Jamaica, October 1938, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 20, Jan. 1939	The Yield of Sugar Cane in Barbados in 1938.
No. 21, Sept. 1939	The Yield of Sugar Cane in Barbados in 1939.
No. 22, Nov. 1940	Report on a Third Visit to Jamaica, October 1940, by A. E. S. McIntosh, B.Sc., Ph.D.

No. 23, Sept. 1941	The Yield of Sugar Cane in Barbados in 1940.
No. 24, July 1942 (Out of print)	The Yield of Sugar Cane in Barbados in 1941.
No. 25, Jan. 1944	The Yield of Sugar Cane in Barbados in 1943.
No. 26, May 1944	A. Report on a Fourth Visit to Jamaica, Jan.—Feb. 1944, by A. E. S. McIntosh, B.Sc., Ph.D. P. Sugar Cane Mosaic Disease in Jamaica and Barbados, by B. deL. Inniss, B.Sc., A.I.C.T.A. C. Report on a Visit to Trinidad, February 1944, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 27, Nov. 1944	Report on a Visit to British Guiana, July and August, 1944, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 28, Oct. 1944 (Out of print)	The Yield of Sugar Cane in Barbados in 1944.
No. 29, Nov. 1947	Report on a Visit to Jamaica, September—October 1947, by B. deL. Inniss, B.Sc., A.I.C.T.A.
No. 30, Dec. 1949.	Report on a Visit to The Dominican Republic, August 1949, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 31, Jan. 1950	Report on the Sugar Cane Variety Situation in Trinidad by G. C. Stevenson, B.A., A.I.C.T.A.
No. 32, June 1950	Report on the Sugar Cane Variety Situation in Jamaica, April 1950, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 33, Jan. 1951	Report on a Visit to the Sugar Cane Research Institutes of the U.S.A., November 1950, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 34, Feb. 1951	Report on a Visit to British Guiana, January—February, 1950, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 35, June 1951 (out of print)	Report on a Visit to Guadeloupe, April 1951, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 36, June 1951 (Out of print)	Report on a Visit to St. Lucia and Grenada, July, 1951, by G. C. Stevenson, B.A., A.I.C.T.A.
No. 37, Jan. 1954 (Out of print)	Sugar Cane Varieties in Barbados—An Historical Review—by G. C. Stevenson, B.A., A.I.C.T.A.

APPENDIX I.

METEOROLOGICAL OBSERVATIONS RECORDED AT THE METEOROLOGICAL STATION, CODRINGTON

Height above Sea Level 181 feet
Latitude 13° 7′ 36″ N. Longitude 59° 35′ 57″ W.

The following are the summaries of the observations recorded for the year 1954. The details are given in Appendix II.

Barometric Pressure. The records refer to observations made at the hours of 9.00 a.m. and 3.00 p.m. only, and are expressed in inches of mercury. During the year 1954, the mean pressure corrected for temperature and gravity and reduced to sea level was at 9.00 a.m. 29.960 and at 3.00 p.m. 29.885, the highest pressure recorded being 30.076 on 30th January and the lowest 29.745 on 19th November. For the ten-year period 1944—1953, the average barometric pressure was at 9.00 a.m. 29.975 and at 3.00 p.m. 29.900, the highest pressure recorded at 9.00 a.m. during the ten-year period was 30.131 on the 21st February, 1946, and the lowest pressure recorded at 3.00 p.m. was 29.658 on 12th November, 1946.

Temperature. The daily mean maximum temperature for the year 1954 was 84.8°F. and the daily mean minimum 72.1°F. The maximum extreme for the year was 90.5°F. registered on the 9th and 14th August, and the minimum extreme 63.5°F. registered on the 31st December. The average monthly mean temperature was 78.4°F., the highest monthly range 21.0°F. and the lowest 17.0°F.; the mean monthly range being 18.7°F. For the ten-year period 1944—1953, the daily mean maximum was 85.2°F. and the daily mean minimum 72.5°F. During the same ten-year period the average monthly mean temperature was 78.7°F.; the maximum extreme was 95.0°F. on the 21st August, 1943; the minimum extreme was 60.5°F. on the 29th February, 1944, and the 11th and 15th January, 1949; and the average monthly range 18.8°F.

Tension of Vapour and Relative Humidity. The mean tension of vapour for the year 1954 was at 8.00 a.m. .750 and 4.00 p.m. .711. The mean relative humidity was at 8.00 a.m. 74.9 per cent. and at 4.00 p.m. 66.4 per cent.

Wind. The daily (24-hour period) mean velocity of the wind during the year 1954 was 8.6 miles an hour. Records were kept of the half-daily or twelve-hour periods from 6.00 a.m. to 6.00 p.m. and 6.00 p.m. to 6.00 a.m. The maximum velocity for any such twelve-hour period was 20.2 miles an hour recorded between 6.00 a.m. and 6.00 p.m. on 24th of June and the minimum velocity 1.9 miles an hour recorded between 6.00 p.m. and 6.00 a.m. on 28th of July. The average daily (24-hour period) velocity for the ten-year period ended 1953 was 9.0 miles an hour.

Rainfall. The Rainfall measured at the Government Meteorological Station during the year 1954, amounted to 49.53 inches. Rainfall was recorded on 214 days, the greatest fall being 1.91 on the 4th of September. For the ten-year period 1944—1953, the average total rainfall was 53.50 inches, and the average number of days annually on which rain fell was 189.

Rainfall of the Island. The average total rainfall for the year 1954 from 68 stations was 61.79 inches, being 1.67 inches above the average for one hundred years ended December 31, 1953, which was 60.12 inches. Details are given in Appendix III.

Appendix II

METEOROLOGICAL REPORT FOR 1954

Month	Barometric Pressure Reduced to 32°F Latitude 45° and Mean Sea Level					Temperature °F								Tension of Vapour			Relative Humidity			Velocity Miles per Hour	Daily Mean Sunshine (Hours)	Rainfall (Inches)	No. of Days on which Rain Fell
	9 a.m.	3 p.m.	Mean	Highest	Lowest	Max. Mean	Min. Mean	Max. Extreme	Min. Extreme	Mean for Month	Range for Month	Dew Point 8 a.m.	Dew Point 4 p.m.	8 a.m.	4 p.m.	Mean	8 a.m.	4 p.m.	Mean				
January ...	29.998	29.913	29.955	30.076	29.851	82.0	70.1	83.5	66.5	76.0	17.0	68.7	67.3	.699	.668	.683	77.0	68.3	72.6	8.9	7.9	3.25	21
February ...	29.996	29.909	29.952	30.064	29.841	82.9	69.8	85.5	66.5	76.3	19.0	67.9	65.3	.683	.625	.654	76.6	61.3	68.9	9.3	8.5	1.81	16
March	29.996	29.912	29.954	30.057	29.865	84.4	70.4	86.5	65.5	77.4	21.0	68.1	66.4	.687	.650	.668	71.2	62.0	66.6	9.6	8.5	1.74	14
April	29.982	29.902	29.942	30.060	29.837	84.7	72.1	87.0	68.5	78.4	18.5	69.2	67.6	.715	.679	.697	72.5	64.1	68.3	10.8	8.0	2.61	18
May	29.958	29.890	29.924	30.037	29.845	87.6	73.1	89.5	70.0	80.3	19.5	69.7	67.7	.725	.675	.700	67.6	59.2	63.4	8.9	8.8	1.75	7
June	29.966	29.908	29.937	30.018	29.859	86.3	74.0	88.5	70.5	80.1	18.0	70.9	69.6	.753	.730	.741	71.2	64.8	68.0	10.2	8.8	4.62	14
July	29.955	29.899	29.927	30.027	29.809	86.4	74.0	88.5	70.5	80.2	18.0	72.4	70.5	.800	.755	.777	75.8	66.2	71.0	8.5	10.1	3.33	23
August ...	29.942	29.879	29.910	30.014	29.811	88.1	73.5	90.5	71.0	80.8	19.5	72.8	63.4	.809	.764	.786	74.4	63.7	69.0	6.7	9.7	2.60	19
September ...	29.946	29.876	29.911	29.990	29.797	86.3	73.4	88.5	70.5	79.8	18.0	71.1	69.2	.827	.776	.801	76.4	70.4	73.4	6.6	7.2	9.10	22
October ...	29.934	29.851	29.892	30.002	29.757	83.6	72.4	86.5	68.0	78.0	18.5	72.5	71.0	.799	.762	.780	79.7	74.0	76.8	7.4	6.7	8.08	21
November ...	29.918	29.832	29.875	30.004	29.745	83.4	72.2	85.5	67.5	77.8	18.0	71.9	70.9	.789	.757	.773	78.9	73.8	76.3	7.6	8.2	7.19	17
December ...	29.925	29.845	29.885	29.974	29.772	81.8	70.5	83.5	63.5	76.1	20.0	69.1	67.9	.718	.687	.702	77.6	69.6	73.6	8.5	7.9	3.45	22
Total ...	359.516	358.616	359.064	360.323	357.789	1017.5	865.5	1043.5	818.5	941.2	225.0	844.3	816.8	9.004	8.528	8.762	898.9	797.4	847.9	103.0	100.3	49.53	214
Average	29.960	29.885	29.922	30.027	29.816	84.8	72.1	87.0	68.2	78.4	18.7	70.4	68.1	.750	.711	.730	74.9	66.4	70.7	8.6	8.4	4.13	18

Appendix III

BARBADOS RAINFALL FROM JANUARY TO DECEMBER, 1954

Name of Station	Number of Stations	January		February		March		April		May		June		July		August		September		October		November		December		TOTAL	
		Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches
District "A"—St. Michael																											
Lowlands	6	17	3.35	10	1.97	12	1.74	14	2.82	5	2.11	13	4.38	20	3.52	16	2.20	21	10.75	19	9.09	17	6.72	16	3.10	180	51.75
District "B"—Christ Church																											
Lowlands	7	13	2.01	9	1.75	8	1.11	14	2.68	5	2.42	12	4.70	18	3.77	15	2.72	18	6.92	17	9.88	15	5.57	13	3.43	157	46.96
St. George																											
Highlands	2	20	6.85	17	3.59	16	2.21	18	5.90	7	2.73	15	5.73	22	4.90	20	3.17	23	9.72	22	12.46	21	8.12	18	5.22	219	70.60
Lowlands	5	15	3.48	14	2.86	12	1.99	14	3.25	5	2.15	13	5.38	22	4.41	15	2.27	20	10.32	20	10.91	17	8.53	15	4.22	182	59.77
District "C"—St. Philip																											
Highlands	2	14	3.63	12	2.92	11	1.87	12	4.64	7	3.46	12	5.97	22	4.14	17	3.68	20	6.93	19	13.91	16	8.77	17	5.67	179	65.59
Lowlands	8	14	2.29	9	1.56	8	1.29	13	3.03	4	1.99	12	5.13	18	3.66	15	3.72	17	6.86	19	11.69	15	6.55	14	4.27	158	52.04
St. John																											
Highlands	6	20	5.42	14	3.03	13	2.05	14	5.34	8	3.43	14	5.32	20	4.30	19	3.07	22	8.98	24	13.66	20	8.84	20	5.48	208	68.92
Lowlands	1	15	4.52	11	1.97	10	1.38	13	3.57	8	1.85	10	4.50	18	3.48	14	1.65	16	6.88	21	11.76	18	7.28	14	3.64	168	52.48
District "D"—St. Thomas																											
Highlands	5	19	6.47	16	3.75	15	2.64	18	6.02	9	2.38	13	5.60	19	4.43	19	4.19	22	10.75	21	18.48	20	11.11	20	5.89	211	81.71
Lowlands	2	19	6.01	11	2.71	10	2.14	14	5.30	7	2.36	11	5.55	15	3.42	17	2.82	19	10.67	22	17.19	21	9.45	16	4.76	182	72.38
St. James																											
Highlands	1	16	6.94	14	3.96	12	2.64	15	6.57	8	2.95	14	6.47	19	9.55	19	3.44	21	12.27	22	15.64	18	9.77	20	5.59	198	85.79
Lowlands	6	16	5.11	11	2.05	9	1.18	12	3.23	6	1.42	11	4.23	14	3.10	15	2.24	18	10.58	18	14.15	18	7.89	16	3.47	164	58.65
District "E"—St. Peter																											
Highlands	1	9	3.99	7	1.43	13	2.68	10	2.39	6	1.30	10	4.54	10	2.89	14	2.25	17	8.93	14	10.98	13	4.75	15	3.87	138	50.00
Lowlands	5	14	6.80	13	2.79	10	1.77	13	4.03	7	1.87	12	4.11	18	3.96	15	3.63	18	11.97	18	13.05	16	8.94	14	4.09	168	67.01
St. Lucy																											
Lowlands	3	12	3.81	7	1.38	9	1.49	10	3.12	5	1.65	11	4.45	15	3.26	13	2.31	17	9.11	14	11.02	12	5.49	10	3.37	135	50.46
District "F"—St. Joseph																											
Highlands	4	16	5.74	14	2.79	15	1.93	13	4.31	9	2.80	13	5.20	18	4.73	17	2.73	20	9.65	22	12.75	19	7.87	16	5.40	192	65.90
St. Andrew																											
Highlands	2	13	5.86	13	2.55	9	1.33	11	3.62	8	2.08	13	4.16	18	4.46	18	2.80	19	10.70	19	11.45	18	8.07	14	4.80	173	61.88
Lowlands	3	11	4.83	9	1.93	10	1.52	11	3.35	6	2.07	9	3.76	14	3.26	14	2.17	18	9.89	18	10.49	15	6.66	11	3.64	146	53.57
Totals	69	273	87.11	211	44.99	202	32.96	239	73.17	120	41.02	218	89.18	320	75.25	292	51.06	346	171.88	349	228.56	309	140.38	279	79.91	3,158	1,115.46
Average		15	4.84	12	2.50	11	1.83	13	4.06	7	2.28	12	4.95	18	4.18	16	2.84	19	9.55	19	12.70	17	7.80	16	4.44	175	61.97